Why ask for the moon
when we have the stars?

AS

THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

EDITED BY

WILLIAM CROOKES, F.C.S.

VOLUME II.

"*Nulla recordanti lux est ingrata.*"—MARTIAL.

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THE PHOTOGRAPHIC NEWS.

Vol. II., No. 27.—*March* 11, 1859.

It is with no small amount of pride and gratification that we now address our readers in the first number of our Second Volume. And, in doing so, it is only right that we should return our sincere thanks to those who have so widely supported us. Not only are our thanks due to our regular subscribers, but they are especially due to those gentlemen—ay, and ladies, too, who have favoured us with their thoughts and hints on matters photographic.

When we made our first bow to the public, we felt that the arrangements which we had effected were of a character so unique and complete, that they could not prove otherwise than attractive. In this we were not disappointed. Our experience has only tended to show how correct we were in our conclusions. If an additional proof were wanting of the new and important features introduced into photographic literature by ourselves, we should have but to state that not only have those features been appropriated by others, but, actually, the very plan of our typographical arrangement has been adopted; thus furnishing a striking illustration of the truth of the remark, that "Imitation is the sincerest form of flattery," as well as, in our opinion, the most abject.

We now propose briefly to review the manner in which we have carried out the promises made at the outset. We had early intimated that a most important department of the "News" would be, the "Notes and Queries" on photographic matters. The object we had in view was to furnish to the beginner and amateur help and guidance in the early stages of photographic manipulation, and, at the same time, to make our publication the vehicle of mutual instruction and information between experienced operators. To the learner, no little assistance has, we feel, been rendered. Were proof of this wanted, we could easily fill our pages with letters gratefully and thankfully acknowledging the assistance derived from our pages; while, for a proof of the extent to which the Notes and Queries have been made the medium of an interchange of photographic knowledge, we need only refer our readers to the first volume of the "News." The next feature which we proposed to ourselves at the outset was headed "information, derived from foreign as well as domestic sources, of all discoveries and improvements in photography, optics, photographic chemistry, and other cognate sciences." This department has been of great and important benefit to photographers; as the information which we have gathered from foreign sources has been carefully translated and condensed, so as to enable the reader to see at a glance the progress which our continental neighbours are making: while, if a proof of the importance of the information given on home matters were wanting, we need only refer to the fact, that the last important application of the art by the father of English photography—photoglyphy—was first communicated to the world through the pages of the "News."

The Elementary Lessons in Photography, together with a Dictionary of Photographic Terms, was a want which was at once apparent to us at the commencement of our undertaking, and we feel confident that this department cannot have proved otherwise than highly beneficial, not only to the beginner, but to the amateur. Added to this, the "Lessons on Colouring" seem to have given great satisfaction; not only to the amateur, but to the professional photographer. We are convinced that, ultimately, these lessons will have an important effect on the character and style of the cheaper class of photographs. We need not expatiate on the well-known fact that many photographers who use the art in a professional point of view, are greatly deficient in artistic knowledge, not only in the colouring of their productions, but also in the posing of the figure of the sitter, and in the arrangement of background accessaries. When, then, these lessons are consulted and acted upon, they will do much, ultimately, to raise the character of the cheaper class of portraits; and, at least, impart a degree of artistic elegance to these productions. In the Reviews of Photographic Works, and the Critical Notices of Exhibitions, we have always endeavoured to give a fair, candid, and impartial criticism; never, for a moment, degrading our pages into advertisement sheets, but passing on the productions submitted to us an unbiassed judgment.

Of the manner in which we have endeavoured to carry out another portion of our programme, viz., the Reports and Transactions of English and Foreign Photographic Societies, our readers are the best judges. They are fully acquainted with the difficulties which beset our path, and the narrow-minded and monopolising spirit with which we have had to contend. To these we do not more than incidentally allude, as we are conscious, that by this time our opponents have felt how severely they have been censured, and that ere long the opposition which has, in so undignified a manner, been shown to the "News," will be one of the things of the past. Our one great hope, that the "Photographic News" should "become the recognised organ of photography; the guide and instructor of the beginner; the medium of communication and interchange of ideas between advanced students; and the record of all improvements and discoveries which may take place in the art," has been fulfilled in a manner that, in our most sanguine moments, we never dreamt of. We can point, with no little pride, to this fact, that not a week has elapsed since our first appearance in which we have not been quoted, not only in the leading daily journals, but also in our contemporaries who are more especially devoted to literature and science; and many times have we received the compliment of being entitled the "recognised organ of photography."

Notwithstanding the fact that we have greatly exceeded our promises in many instances, we are by no means satisfied with even our present position; we are anxious to be still more useful, and to be the means of greater benefit to our supporters.

ENGLISH PHOTOGRAPHY FROM A SWISS POINT OF VIEW.

The following not altogether unreasonable remonstrance has been addressed by Dr. Kolb, of Geneva, to Mr. Ernest Lacon, the editor of a foreign contemporary :—

"The possession of a robust faith seems absolutely necessary to induce one to adhere to the original collodion process in the face of the numerous modifications which have been, without rhyme or reason, introduced.

"We are a pretty good number of amateur photographers here, who still stick to the old method, and it suits us too; for those among us who, more adventurous, have departed from the good old path to follow the pretended improvements, have very soon returned to the original plan.

"Observe, that I am now speaking only of collodion. Subscribers to your journal from its commencement, we have followed the progress of our art, and have practically appreciated the real discoveries that have been described therein. We include among these the use of albumen in the dry collodion process; but we do not see why—considering the beautiful results obtained by its means, and that eggs may be got everywhere—so many persons should advise the employment of caseine, gelatine, &c. &c.—substances that are much inferior to it, and which, while more difficult to obtain, necessitate complicated manipulations. . . . .

" . . The collodion we use is that iodised with iodide of potassium, which is the only iodide of commerce; it is, relatively much cheaper than any of the others, and, being extensively used in medicine, may be bought at every druggist's in every country—the latter consideration being one that tells greatly in its favour. On a photographic tour in the Alps, Pyrenees, Egypt, or Spain, or in any other out-of-the-way place, if you lose or break a bottle of iodide of cadmium or ammonium, your movement will be suspended until you have been able to get another from some large town, which may occupy some days, while iodide of potassium may be obtained at once and anywhere." (What, even in the Alps or Pyrenees, Doctor?)

"M. l'Abbé Despratz says :—'We will say positively that, with a collodion simply iodised with the iodide of potassium, we may easily attain perfection.' How can we reconcile that with the opinions of our neighbours over the other side of the channel? In a recent number of your journal, Mr. C. says, positively:—'Collodion, containing iodide of potassium, ought not to be used;' and he goes on to propose a formula, in which he substitutes for this common substance, iodides of cadmium, ammonium, and calcium, to which he adds bromide of ammonium; for ordinary ether—so humble a substance that it may be found in any village—he substitutes methylated ether. Finally, in using the dry process, instead of covering his glasses with vulgar albumen, he steeps them with a solution made of nitric acid and Nelson's gelatine, and dries the whole in an oven heated to a temperature of 140°.

"Possibly, after all this, one may get proofs by its means, but I confess that it is both expensive and impracticable in travelling. A man could hardly drag an oven about with him! You may say there are bakers everywhere! But a baker's oven is not the place where one may cook all kinds of things; besides it would be too hot, too dusty, and always more or less exposed to the light. Again, what is meant by Nelson's gelatine? The author, by his silence as to its origin, would lead one to believe that it was prepared from the bones of the celebrated admiral of that name. Evidently, however, this cannot be the case. It must, therefore, be a reclamation in favour of a manufacturer of the name of Nelson; but who abroad knows him? When a man publishes a formula, however curious it may be, he ought at least to make it appear practical to everybody. Now Nelson's gelatine comes in just in the nick to stop those among us who are Anglomaniacs from repeating Mr. C.'s experiments.

"I am far from desiring to contest the merits of the English in having advanced the photographic art; and, apropos of the advancement of that art among different nations, we have, in our little cœnaculum, decreed the palm to that nation for the improvements they have introduced in the optical apparatus. But as to their chemical formulæ we have, for the most part, found them to smack strongly of the kitchen.

"What progress, what amelioration has resulted to photography from the use of linseed, rice water, fine honey, metagelatine, ceroleine, glycyrrhizine, oxymel, methylated ether, chloroform, iodoform, iodide of tetrethylammonium, camphor, oil of cloves, naphthalised ether, alum, nitrate of barytes, acetate of lead, chlorides of barium and strontium, &c.&c.&c.? Now all these drugs, or rather all the formulæ containing them, come from the other side of the channel.

"We are convinced that the true friends of photography in England will agree with us in blaming this unreasonable abuse of a heap of substances which are rather hurtful than otherwise to the object they have in view, and which, in any case, disturb the minds of those who are not sufficiently proficient to comprehend their inutility. Even by the revelations of your journal we know that the photographic triumphs of Claudet, Crookes, and other learned and able English photographers, have been extended beyond the use of these photogenic compounds. Niépce has shown us that we may practise photography with all kinds of substances. We have approved his use of the salts of uranium, his application of ferrocyanide of potassium, because all of these modifications were rational, and contained the germ of a regeneration of the art. But we do not see any similarity between these and the application of the drugs of which we have given a greatly abridged list. . . . . . ."

PRINTING IN CARBON.*

BY M. DE BREBISSON.

The printing of positive proofs by means of carbon has, as yet, been too little practised for completely satisfactory results to be expected. Consequently, I should not have published my first efforts in this way, if I had not been assured that the Society wished to collect all the documents concerning this process. . . . .

When I began my experiments in the use of carbon for positive proofs, I had no precise information; I had, therefore, to continue my experiments, until I hit upon the following formula :—

In 100 parts of water, saturated with bichromate of potassa, I dissolved, with the assistance of heat, 8 to 10 parts of white gelatine. At this season of the year it is advisable to dissolve the bichromate in almost boiling water to make sure of saturating it. I make the solution of gelatine in a porcelain dish, which, when heated, preserves for a long time sufficient heat to allow of a large number of sheets of paper being prepared.

The paper I prefer is that the texture of which is finest, and which is well glazed. The sheets being cut in the desired form, I float them successively, for a few seconds, on the warm gelatine and bichromate of potassa bath; and, then, suspend them to dry. (I may observe, in passing, that this paper, though protected from the light, will not preserve its photographic properties longer than a few days. The gelatine seems to lose its solubility, and the designs are without vigour.) When the paper is thoroughly dry, I expose it under a negative in the printing frame. The exposure must be, at least, four times as long as in the case of the ordinary positive paper, coated with the chloride of silver.† When the deepest shadows have taken a rather red colouring on the paper tinted yellow by the bichromate, I withdraw the proof. It is not necessary to wait until the details of the half-tones are visible. Once more in the dark room, I place the paper acted upon, face upwards, on a glass upon which I fix it by means of gum.

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* Read at the last meeting of the French Photographic Society

† To obtain even this rapidity it is necessary to use a solution prepared with crystals of bichromate, recently separated from the solution in which they were formed.

The next proceeding is to cover the picture with a black powder, or with powder of any other colour, provided it is of extreme tenuity. Whatever the powder may be, its adherence to the paper is obtained by stumping its surface with a ball made of cotton. I at first used plumbago, lampblack, and ochre. I now accord the preference to a kind of black manufactured by M. Delahaye. It gives a less leaden aspect to the proofs than other charcoal blacks which I used previously.

When the black is spread evenly over the surface of the paper by means of rather light friction, the sheet of paper, blackened side upwards, is laid at the bottom of a basin, and covered with a film of boiling water. After a little agitation, this first water, which dissolves the greater part of the bichromate of potash, is thrown away. More hot water is then poured on, and the cleansing of the design proceeded with.

This operation may be performed with cotton rolled up into a ball, but I find it better to use a sort of brush made of shreds of fine muslin. Thanks to the handle of this little instrument, it is not necessary to scald one's fingers, which may very well happen with the cotton ball. By passing this brush over the surface of the proof, those parts on which the light has not acted are cleaned. The layer of gelatine on these parts remains soluble, and comes away easily, bringing with it the black substance which covers it. This part of the process must be performed with caution. The design may, sometimes, be improved by weakening the too deep shadows, or by protecting the vigours necessary to the effect. If the insolation has been too prolonged, the adherence of the black will be diminished, and the deep shadows will have a disagreeable reddish tint, which cannot be concealed. When, on the contrary, the action of the light has been insufficient, the gelatine comes off in large patches, even without the application of the brush, the design then clashes, and is without half-tones. The action of a cloudy but luminous sky is more favourable to a proof than the brilliancy of a strong sunlight, which attacks the shadows too rapidly.

In several papers, concerning this process, the spreading of the layer of black before insolation is prescribed, which seems to me not very rational. As may be imagined, the presence of the powder impedes the action of the light, and the design is never so perfect. Experiments that I have made on the different halves of the same paper leave no doubt in my mind on that point, since I have always obtained better results by applying the black after insolation. . . .

It is desirable that a black should be manufactured of a vivid tint, and not greyish, reduced to a powder as fine as possible, but not so fine as to prevent its molecules from remaining distinct; or, otherwise, shining patches will be formed where there ought to be appearance of *grain*. This fault exists more especially in the case of plumbago, the laminar molecules of which, always passing over the outlines, border it with fringes or inequalities, so much dreaded by lithographers and engravers.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

ON SENSITISING—(*continued*).

On the Preservation of Sensitised Sheets (continued).—This appears to be the place for strengthening our remarks by an important observation. Everybody must have observed, that photographic papers alter more on the back than on the face—a fact easily explained; since on the face the free nitrate finds itself surrounded by chloride of silver, which does not assist in the alteration; while the back is charged with free nitrate alone, which has been drawn there by capillary attraction.

The manner of manufacturing the paper, its porosity, and the nature of the substances with which it is sized, play a certain part in the alteration. Thus, we have remarked that, the strongly-sized English papers kept better than others; and that among the French papers, those which were the least sized were the first to change. This fact may be easily explained by the relative impermeability which the sizing gives to the paper, which thus acts as a check on the absorption of free nitrate by capillary attraction.

This observation has led us to think that the salts of aluminium, which possess the property of rendering tissues impermeable, might, employed judiciously, give to photographic paper preservative qualities. Experiment has verified this hypothesis. It has shown us, in fact, that positive papers prepared on a bath of chloride of sodium strengthened with only 1 per cent. of alum, kept much longer than the same papers prepared in the ordinary manner.

After having thus established the elements which intervene in the alteration of sensitised papers, we occupied ourselves in seeking the law which these obeyed. Recent experiments on the alteration of ozonometrical papers in moist air, led us to think that humidity must play a chief part in this reaction, and that if we could manage to preserve the paper in a condition of absolute dryness, it would preserve its value and properties in some undefined manner; and experiment has fully confirmed this idea. Fragments of positive papers of every manufacture were left for three months where they were protected from the light, in glass flasks hermetically sealed, and in which hygrometrical substances, such as chloride of calcium, carbonate of potassa, &c., were introduced in such a way as to desiccate not only the air therein, but the paper itself. At the end of the time named, the papers had not undergone the slightest change; they were not at all tinted, while the other parts of the same papers preserved simply in portfolios, were coloured with the intensity which every one has remarked.

Thus, when we preserve sensitised papers in a completely dry state, in an atmosphere likewise dry, they undergo no alteration; and, at the end of three months, are equally well-suited for photographic purposes as on the first day.

This method, of which no person hitherto has made known the principle or its application, may render the highest service to photography. Therefore we have had constructed by one of our ablest manufacturers, different models of apparatus adapted for the accomplishment of this object, and which, from their low price, may be accessible to all.

The employment of similar apparatus, the efficacy of which we have ascertained as regards positive papers, will probably, judging by experiments we are now conducting, offer the same advantages for sensitised negative papers, as well as for glass plates, and will enable photographers who reside at a distance from the place of manufacture to obtain papers ready nitrated without their being in the slightest degree deteriorated by the journey. It will likewise enable photographers to utilise a bad day by preparing a stock of paper for future operations, when the weather is more favourable.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY.*

BY T. FREDERICK HARDWICH.

The publication of a fifth edition of a book on Photographic Chemistry, &c., seems to imply either that there is a great lack of works on the subject of which it treats, or that the book is the best of its kind. In the case of the book we are about to examine, both these reasons may have had something to do with its extensive sale; there is no other really good work on photography with, perhaps, one exception, which is of the same size, and none which more completely exhausts the subject in all its branches.

Mr. Hardwich commences his book with a historical notice of the rise and progress of the art of photography, which, interesting as it is in itself, would convey no information to the readers of this journal, who have had such abundant opportunities of informing themselves of everything relating to the subject, from articles we have published in it at various times since its foundation. Nor is it necessary that we should dwell on that portion of the work devoted to chemistry, and the various manipulations, ably as Mr. Hardwich treats these subjects, since they have been, or are being, treated of in this journal in detail; we shall, therefore, proceed at once to a consideration of what the author rightly considers a very important part of his book, viz.: the nature and properties of collodion.

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* Continued from vol. i., page 279.

* Churchill, New Burlington Street.

There are different varieties of pyroxiline, the peculiar character of each resting on the strength of the nitro-sulphuric acid used in its preparation. That called gun-cotton contains the largest amount of peroxide of nitrogen, and can only be dissolved in acetic ether. In the preparation of this the strongest nitro-sulphuric acid is employed.

Another form in which pyroxiline exists is termed xyloidine, and is the substance obtained by treating starch with nitric acid.

Neither of the above preparations is that employed in photography. The method described by Mr. Hardwich, and adopted by him in the manufacture of his collodion, consists in treating cotton-wool with a mixture of nitric and sulphuric acid in certain proportions; the effect of which is to produce a change in the properties of the cotton, increasing its weight by more than one half, and rendering it soluble in various liquids. The reason he gives for employing cotton-wool rather than calico or linen rags is, that the two latter are more likely to yield a bitter resin in the manufacture of collodion, the effect of which is to diminish the sensitiveness of the film to obscure radiations, while it increases the rapidity and intensity of the development in negative pictures.

Another effect of the action of the nitro-sulphuric acid is to *parchmentise* the fibre, so that good photographic collodion may be termed vegetable parchment rendered soluble in ether and alcohol. To this parchmentising of the fibre by the action of sulphuric acid is owing the peculiar firmness and strength of this collodion; and likewise Mr. Hardwich claims for it the merit that it gives a more intense negative image than ordinary pyroxiline, and is very clean on the parts not acted upon by the light. We have not yet had a satisfactory opportunity of testing its merits on these points, but as far as we have experimented we have not found it inferior to that of our best makers.

The nitro-sulphuric acid used in this operation is not the strongest that can be made, because, as we have already mentioned, the result in that case would be the production of gun-cotton.

In common with some other makers, Mr. Hardwich employs rectified ether of commerce as a solvent of pyroxiline, this containing a certain proportion of alcohol, the presence of which appears to be essential; indeed, we believe the proportion of alcohol used by Mr. Hardwich is considerably greater than that ordinarily used, being about equal in amount to the ether, the strength being ·810. The presence of ether in collodion in great excess renders the film very strong and tough, as well as contractile; the addition of alcohol changes this, and the film, which before was very tough, becomes soft, and possesses but little coherency; while the addition of a very small proportion of water would make it so rotten that it would wash off the plate.

Collodion which has been iodised with iodides of potassium, ammonium, or zinc, owing to a development of free iodine by a peculiar action of the ether, very soon assumes a yellow tint, which gradually deepens to a brown; consequently it is of the greatest importance that plain collodion should be kept in a cool place, and protected from the light, or otherwise it will become coloured immediately on the addition of the iodiser.

In the preparation of collodion, Mr. Hardwich keeps the material in the acids for ten minutes instead of five; and in this he agrees with the practice of the Abbé Desprats, who has just stated in an article on the subject, of which we shall shortly publish a translation, that, "ten minutes is necessary for a perfect transformation of cotton into pyroxyline;" but in other points they differ considerably, Mr. Hardwich being of opinion that "the lowest temperature at which good photographic pyroxyline can be made is about 130° Fahrenheit, and the highest at or near 200°;" while the Abbé expresses a decided opinion that the addition of artificial heat is quite unnecessary, and that a similar product suitable for all photographic purposes may be easily obtained by the reaction of ordinary sulphuric acid on pure nitrate of potassa, at the ordinary temperature. The modes of preparing this substance differ so much in minor points, and the results of some of these processes are so equally good, that we prefer to found an opinion of the collodion under consideration upon the results obtained by its means, and shall not, therefore, criticise the manner of its composition.

Another highly important matter, on which the author has bestowed great labour and research, is dwelt upon at considerable length, viz.—the uses and properties of the different salts of silver. The explanations given are so full and lucid, that they may be readily comprehended even by one who had no previous knowledge of chemistry. Much of the nitrate of silver sold to photographers is impure, and therefore unfit for photographic purposes; a circumstance sometimes unknown to the manufacturer, who may give rise to the impurity from his method of preparing the article without having any design of adulterating it, and who is unaware of the injurious effects such a method may have on the result; while there are, no doubt, some manufacturers of nitrate of silver who, tempted by the high price to be obtained for this substance, wilfully adulterate it. As regards the former course, we have been informed that one specimen in which charcoal had been boiled, on being tried, immediately turned what should have been a negative into a transmitted positive; doubtless, from the charcoal being contaminated with organic matter. It is, we have no doubt, in consequence of the impurities contained in the nitrate of silver, that we receive so many letters from correspondents complaining of faults in their baths; for which it is often impossible, from the description given, to suggest a remedy. Mr. Hardwich has exerted himself to induce some manufacturers to improve their process, and to a certain extent he has been successful. In more than one instance he has induced them to do away with the use of charcoal in making photographic nitrate, and also to prepare pure re-crystallised nitrate purposely for the bath at a very small additional cost.

He has re-modelled and divided into two portions that part of his work which refers to the composition of the image. He is of opinion that organic matter makes an essential difference in the properties of the image, and that it may eventually be found that it acts molecularly as well as chemically, although the former is by no means so evident to him as the latter.

The author's belief in the non-reduction of iodide has been strengthened by experiments; he also considers that the electrical images produced by Mr. Grove are unfavourable to the supposition entertained by some persons, that actinism and electricity are the same thing. In the experiments referred to, a plate of glass was electrised in certain parts, and then breathed on or exposed to the fumes of hydrofluoric acid; in both cases the vapour settled exclusively upon the non-electrical parts of the glass. When the glass was electrised, then coated with iodide of silver and exposed to light, pyrogallic acid produced no reduction.

In the present edition the author dwells at some length on the importance of the presence of bromide in the ordinary iodised collodion used for taking positives; the effect of it being to alter the molecular state of the reduced silver, and to give it a white and metallic appearance, on which to a great extent the beauty of the picture depends. The use of bromide in the collodion with sulphate of iron as a developer.

renders the quality of the pyroxiline a matter of less importance than in the preparation of negative collodions. "Hence the selection of the soluble cotton may be made principally with reference to physical properties, such as smooth flowing and adhesiveness to the glass; and, indeed, the same plain collodion may be used both for positive and negative pictures, the distinction being simply in the iodising solution. In cases, however, where pyroxiline is made purposely for positives, it is as well to prepare it at a tolerably high temperature, since the more gelatinous kinds of collodion have a property of throwing the bath solution into greasy lines, which show upon the picture; and it is advisable also that the pyroxiline be made in nitro-sulphuric acid, with enough of the oil of vitriol to prevent it from *giving an opaque film* when the acid mixture contains the full quantity of water."

In introducing the bromide the operator should be guided as to its quantity by the appearance presented by the developed image. If the high lights appear too dense when the plate has been exposed long enough to form the shadows, it is a sign that more bromide is required; if, on the contrary, the positive is grey and feeble, and this does not arise from over-exposure, the quantity of bromide used should be less. An important effect of the bromide in collodion when in a proper proportion with the iodide, is in keeping the lines sharp and clear during development. The presence of the bromide does really appear to increase the sensitiveness of the film to the action of the light, especially when the collodion is partly decomposed; but this will not be evident if the bath be a weak one, and pyrogallic acid be used as a developer. To bring out the picture it is necessary that the strength of the silver bath should be increased, and sulphate of iron substituted for pyrogallic acid as the developer. The strength of the bath may be carried as high as forty grains to the ounce; and Mr. Hardwich recommends, with good reason, the employment of nitric acid to acidify this bath rather than acetic acid.

In the present edition of the work under review, the observations on collodion negatives are much fuller than in any previous one, and the properties of the chemicals employed are more minutely analysed.

The directions for photographic printing are most elaborate. The various processes of toning are fully described, not omitting that which has excited a good deal of attention lately, viz.—the alkaline chloride of gold process. This process is, however, by no means a new one; there is good reason to believe that it was tried a very long time ago in Paris, before Mr. Waterhouse published his method, though it does not follow that Mr. Waterhouse did not make an independent discovery. It is unfortunate that the re-discovery of different photographic processes should be so frequent, and that a photographic chemist, after researches which have extended over, possibly, many months, should be told when he publishes the result of his experiments, that they are not new, and that M. So-and-so has done the same thing long before. However, we think there is very little chance of accidents of this kind occurring now that the "Photographic News" is established, and if any English photographer is subjected to any such annoyance in future, it must be from his own fault.

Of course, the dry collodion preservative processes receive a lengthened notice, and the writer gives a formula for the preparation of pyroxiline from cotton wool, which he considers better adapted for the dry process than that made from calico or linen, inasmuch as it is more stable, and bears more alcohol without losing its setting powers.

Although we do not deem it necessary, for the reason stated at the commencement of this article, to review at length that part of Mr. Hardwich's book which treats of the various manipulations and processes, a knowledge of which is of so much importance to beginners, we cannot close our remarks without referring to this, in some respects, the most important portion of his work. We have gone through this part of the book carefully, and, though we could have suggested one or two slight additions, we cannot help expressing our entire approval of the minute and lucid manner in which this part of the subject has been treated. With such a guide, a man might commence the study of photography, and with no other he might become as expert a photographer as any one living.

Lessons on Colouring Photographs.

COLOURING IN OIL.

The use of oil colours for finishing photographs has come very much into favour the last few years, not simply for the beauty and richness of the effects which may be produced, but from the conviction that the permanence of the photograph is very considerably increased thereby, the colours themselves and the subsequent varnish largely protecting the picture from outward destructive agencies; so that, if the print have been fixed and washed with anything like adequate care, it may, when coloured in oil and varnished, be regarded as a very near approximation to entire permanency. To the uninitiated the attempt to colour in oil appears very formidable, and one attended with greater difficulties than the use of water colours. This idea is, we apprehend, founded on a mistaken notion. In either case, some knowledge of drawing is necessary to perfect success; but the use of vehicles which preserve their transparency when dry, such as oil and megilp, must offer the greatest facilities to the tyro for preserving the likeness whilst colouring the photograph.

To choose the photograph.—There are two modes of looking at the subject of colouring; one which professional artists most commonly adopt, of regarding the photograph as the basis of a painting,—the other, which photographers are most likely to prefer, of regarding the photograph as a picture perfect in itself, merely requiring the addition of colour in its most simple and transparent form. The latter plan will not always give the most perfect finish, or the most brilliant results; but it will be much more easily practised by the entire novice, and we recommend him to confine to it his first efforts; if he can ultimately achieve more, so much the better. To succeed, then, in this style, it is necessary to select a perfect photograph to work on. It should be clean, sharp, and brilliant, with pure lights, well marked shadows, and good gradation of half-tone. Heavy abrupt masses of shadow severely task the skill of the practised colourist, and would be a complete barrier to the success of the novice. A warm grey or purple brown, not too heavy, is the best tone to select,—a black, inky-looking picture should be avoided.

To prepare the photograph.—For colouring in oil, a print on albumenised paper is best. It should be mounted on cardboard, taking heed to have the gelatine, glue, or whatever may be used for mounting it, free from small pieces of anything hard, which would cause small inequalities in the surface, for these would show very much in the finished picture with a varnished surface. The photograph must then be well sized with a solution of gelatine or Salisbury glue, applying it with a broad, flat camel's-hair brush. Experience will be the best teacher as to the thickness of the sizing. If it be too thick, it will be apt to crack off, and if too thin the oil will be absorbed into the paper, and will "bear out" unequally in drying. When the sizing is dry, the picture should be hot-pressed, or passed between steel rollers. It is then ready for use.

Materials.—These should be purchased by the beginner ready for use; to commence with, the equipment need not be very expensive, but it will be decidedly best to procure a complete box of oil colours, &c., prepared for colouring photographs. The articles necessary to commence with are colours in tubes; various vehicles, and varnishes; pallette, pallette-knife of steel, and another of ivory for use with colours which injure by contact with iron; brushes, and a rest or Mahl stick.

The colours required are as follows:—White, Naples yellow, burnt sienna, raw sienna, extract of vermilion, light red, rose madder, crimson lake, Indian red, red umber, burnt umber, Vandyke brown, terra verte, emerald green, ultramarine, cobalt, Prussian blue, purple madder, brown madder, ivory black. Other colours may often be found valuable, but these will serve to commence with.

Vehicles are the diluents or fluids with which colour is combined for the purpose of working, and the colours dry and "bear out" with different effects according to the vehicles used. The oils used for this purpose are those of linseed, poppy, and nut; the former, drying best, are most generally used. Turpentine is occasionally used to thin with, but should be used very sparingly, as it causes the colours to bear out dead. The most valuable diluent to the amateur colourist is megilp, as, whilst it thins the colours, it does not cause them to flow too much in working; it moreover dries rapidly and preserves the utmost transparency in the colours. It is generally made by the mixture of some varnish and a drying oil, with the addition of a little sugar of lead as a dryer; the result of the mixture is a transparent jelly, which combines with the oil colours readily, and works well. Equal portions of pale drying oil and strong mastic varnish will answer the purpose, but the amateur will do wisely to purchase it ready prepared.

The brushes most useful are those of sable; they should taper to the point well, with a wedge-like shape, retaining the point when wet instead of separating into two or three parts, and should spring well. A few hog-hair tools will sometimes be useful in large pictures, and also a badger tool softener. It is important to have a good selection of brushes and to take care of them; they should always be carefully cleaned immediately after use, for if left clogged with colour they will be ruined. They should be rinsed in turpentine and dried with a soft rag, bringing them to a fine point to finish. A small vessel containing turpentine should always be at hand for the purpose.

Of varnishes the most useful is mastic; as it is brilliant and clear, works well, does not crack, and is most easily removed if required.

A variety of other materials will from time to time be found useful; but we have named the materials with which the picture may be commenced and finished satisfactorily.

(*To be continued.*)

Photographic Chemistry.

ANALYSIS OF SILVER BATHS.

After what has recently appeared in the "Photographic News," on the subject of the impoverishment of the silver bath by the papers submitted to it, it is scarcely necessary that we should dwell on that fact; we may merely mention, therefore, that each sheet lessens the richness of the bath in proportion to the quantity of iodide or alkaline chloride with which it is impregnated; consequently, it is advisable to make a rapid analysis occasionally of the actual richness of the silver bath. By manipulating with care, a closely approximative analysis may be made in a very short time, by means of the following process:—

The analysis of nitrate of silver baths which do not contain either hyposulphite of soda or cyanide of potassium, is founded on the fact, well-known to photographers, that salt decomposes the nitrate of silver, and precipitates the silver in the form of an insoluble chloride; this decomposition being effected in strict proportions—for example, 10 cubic centimètres of normal salted liquor (composed of 5·41 grains of perfectly pure and dry salt in 50 cubic centimètres of distilled water) decomposes precisely 2 grains of nitrate of silver, that is, converts it into an insoluble chloride. To test the quality of a nitrate bath the following plan may be adopted:—Pour 10 cubic centimètres of the normal salted liquor into a stoppered bottle, then a few drops of nitric acid, and, finally, about 10 cubic centimètres of distilled water. Pour a certain quantity of the solution to be analysed into a graduated glass, from which it must be allowed to drop into the stoppered bottle. A precipitation ensues immediately on the liquids coming in contact; and when the whole of the solution is thus decomposed, put the stopper in the bottle and shake it violently; then let it stand for a few seconds, a precipitate falls to the bottom, and the liquor above is quite clear; add a little more of the solution from the graduated glass, at the same time shaking the bottle gently after the addition of each drop to clear the liquid, and mark well the moment when the added drop produces the slightest possible disturbance, and the additional drop none whatever. The test is concluded; by reading on the graduated glass the quantity of silver solution required to saturate the liquid in the bottle, and by a simple rule of three sum, the quantity of silver contained in the bath will be at once perceived.

The above method is applicable to baths of all kinds, whether acid or not, but we may as well give another suitable for testing non-acid baths.

The sole difficulty in the process described above is to seize the exact moment when a drop of the solution to be analysed produces no disturbance in the salted solution, but this difficulty does not present itself when the following process is adopted:—Measure 10 minims of normal salted liquor and pour into a glass; add to it a few drops of solution of bichromate of potash, and, if the bath to be analysed is concentrated, a little distilled water; the liquid will appear of a straw colour. Hold the glass in the left hand, and, by a gentle and steady motion, keep the liquid rotating. With the right hand pour from the graduated glass measure, drop by drop, the solution of nitrate of silver. At first there will be a white precipitate formed; but towards the end of the operation each drop of the silver solution will cause a red spot as it falls into the test solution, which, however, will immediately disappear; until the moment arrives when a single drop suddenly changes the colour of the solution to a permanent crimson red, due to the formation of a little chromate of silver, which happens at the precise moment when all the chlorine of the chloride of sodium has passed into the state of chloride of silver. The operation is now at an end; and it is only necessary to read off the glass the quantity of silver solution used, and to divide these figures in the manner given above, to find the strength of the bath.

(*To be continued.*)

Dictionary of Photography.

Bronzing.—In printing on albumenised paper it sometimes happens that green metallic patches occur on those parts of the paper which have been exposed to the strongest light; and not unfrequently the same appearance is observed in streaks and lines on other parts of the paper. This defect may be obviated by employing the eggs quite fresh and having the albumen well beaten up and then strained so as to separate the fluid portion from the opaque stringy particles of *germ*. If any of the latter get on to the surface of the paper, bronzing is sure to be produced. The paper must also be lowered on to the surface of the prepared albumen with a perfectly uniform motion: any stoppages will be liable to produce bronzed lines across the paper. Any scum on the surface of the albumen salting bath must be removed by drawing across it the edge of a sheet of paper, otherwise the effect we are speaking of will be produced by the adherence of the scum to the surface of the paper. Another very fertile source of bronzing is occasioned by the sensitising bath being too strong in proportion to the amount of salt present in the first bath: 30 grains of salt in the salting bath will bear 120 grains of nitrate of silver without danger of bronzing, but if, as some operators prefer, the salt be reduced to 3 or 4 grains to the ounce, then the silver bath should not be stronger than a 90 grain solution. Bronzing is also frequently produced in the summer months owing to the intensity of the sun's action *burning up*, as it were, the parts of the paper under the transparent parts of the negative before the more shaded parts of the paper are impressed sufficiently deeply; the remedy for this is either to print in the shade or diminish the strength of the silver bath. With some negatives, in which the contrasts of light and shade are very violent, it is next to impossible to produce a good print without some parts appearing bronzed.

Buckle's Brush.—A kind of brush which is of great use in the calotype process, made by inserting a pellet of cotton wool into the end of a glass tube, leaving sufficient exposed to answer the purposes of a brush. For a further account of these useful brushes see vol. i. p. 288.

Buff.—An instrument used for polishing glass or daguerreotype plates: it consists of a piece of wood from 1 to 3 feet in length, and 2½ or 3 inches wide, with a handle projecting from one end. It is slightly convex at the under side, which is covered with some soft material and well padded with cotton wool. Either silk velvet plush, velveteen, or leather may be used for this purpose, but the best material of all is deerskin. It should be well dressed, and deprived of all grease or extraneous matter, and soft and firm in texture.

Cadmium.—A metal similar to zinc in its chemical relations and resembling tin physically: it is very malleable, and is nearly as volatile as mercury, melting below 500° Fah. Its chief value in photography is in its combinations with chlorine, bromine, or iodine, with which elements it forms well-defined crystalline compounds, stable in the air and soluble in alcohol or ether. The preparation of these salts has been fully described in vol. i. pp. 82, 276, 293. Metallic cadmium is sometimes used to remove the red colour from old collodion, which it does by virtue of its affinity for iodine, to which the colour is due.

Calomel.—The ordinary name for subchloride of mercury, $Hg_2\,Cl$. In combination with chloride of silver it forms the white compound to which the beauty of the so called alabastrine photographs is due. It is formed by the union of half of the chlorine present in the corrosive sublimate ($Hg\,Cl.$) with the metallic silver forming the picture. Our chemical readers will at once understand this if given in the form of an equation:—$Ag + 2\,Hg\,Cl = (Ag\,Cl + Hg_2\,Cl)$; thus two parts of corrosive sublimate are required for one of silver, and the result is the formation of a white compound consisting of equal parts of chloride of silver and calomel.

Calorific Rays.—The invisible heating rays which emanate from the sun, and from burning and heated bodies. They are the least refrangible of any rays of the solar spectrum, and are those which are least understood, owing to the very imperfect means which we at present possess of estimating their presence qualitatively or quantitatively. Now that M. Nièpce has discovered a chemical compound which is sensitive to heat (vol. I. p. 277), we hope that the least refrangible end of the spectrum will receive some of that attention which has, up to the present time, been principally directed to the blue end.

(*To be continued.*)

A Catechism of Photography.

IODISING THE PLATES.

Q. How are the albumen plates to be iodised?

A. By submitting them to the fumes of iodine, as in the daguerreotype.

Q. What length of time will this occupy?

A. From two to four minutes, according to the temperature of the room. The vapour of the iodine imparts a yellowish tinge to the albumen.

SILVERING THE PLATES.

Q. How are the albumen plates silvered?

A. The process of silvering is performed by the plates in a nitrate bath composed as follows:—

Water	12	ounces.
Nitrate of silver	1	,,
Glacial acetic acid	1	,,

The solution should be filtered, and a gutta percha bath is recommended.

Q. How long should the plate be allowed to remain in the bath?

A. About one minute and a half. The plates must then be thoroughly washed in distilled water, and placed in a slanting position to dry.

EXPOSURE IN THE CAMERA.

Q. After silvering the plate is it ready for the camera?

A. No; previous to placing the glass in the camera slide it must be passed over the vapour of iodine.

Q. How long a time is necessary for obtaining a good impression?

A. This depends on the colour of the object, the intensity of the light, and the size of the aperture of the camera. The time varies from thirty seconds to ten minutes.

Q. Is not gallic acid sometimes used to hasten the taking of the image?

A. Yes; for this purpose the glass should immediately before using be dipped into a bath of gallic acid, in the proportions of one part acid to ten parts of water.

DEVELOPING THE IMAGE.

Q. How is the albumen image developed?

A. By plunging the plates into a solution of gallic acid.

Q. How is the solution prepared?

A. In the following proportions:—1st. A saturate solution of gallic acid; 2nd, 1 ounce of nitrate of silver in three ounces of acetic acid and thirteen ounces of water. A pint bottle is to be filled three parts with this solution and filled up with water. A sufficient quantity of the first solution to cover the plate is to be poured into the developing dish, and eight or ten drops of the second solution added.

Q. Is the picture rapidly developed?

A. No; it takes several hours, and a few extra drops of the second solution are to be added at intervals.

Q. What is to be done when the picture is fully developed?

A. It must be thoroughly washed in pure water and dried.

Q. Is there no quicker mode of developing the picture?

A. Yes, by pyrogallic acid, but the half tones are seldom so well preserved.

FIXING THE IMAGE.

Q. How is the albumen picture fixed?

A. By being washed in a bath of hyposulphite of soda. This completely removes the yellow iodide, and the picture may then be rinsed in clean water and dried.

Q. Are there not other methods of obtaining albumen pictures?

A. Yes; there are several methods; the formula here given is founded on that of Mr. J. E. Mayall.

OTHER APPLICATIONS OF ALBUMEN.

Q. Are there not several methods of using the albumen process?

A. There are: that of M. Fortier, Mr. Negretti, and others. All differ in some particulars, while they are the same in the main principles.

Q. Is the method of cleaning the glass varied in these processes?

A. No, cleaning the glass is absolutely the same in all; and is similar to that which is used in the collodion process.

Q. In what respect do the processes chiefly differ?

A. In the method of preparing and applying the albumen. Thus, some photographers employ iodide of ammonium in preference to iodide of potassium; some prefer decanting the albumen after it has been prepared, and others use it out of the basin in which it has been mixed. Negretti, for instance, prefers it on this account, as he says that the albumen, after it has subsided, leaves a thick crust on the top, and, in order to pour it on the plate, it has to force itself through this crust, consequently, it filters itself at the same time.

Q. Is there much variety in the other parts of the process?

A. No; except such as are peculiar to each operator.

Q. Is not the process of M. Bacot more rapid in its action than that which is generally employed?

A. It is; the process is as follows:—Heat in a china capsule a solution of—

Distilled water	45 parts.
Dextrine	9 "
Iodide of potassium	3 "
Bromide of potassium	0·5 "

Add to it the whites of six eggs, from which the germ has been previously removed. Beat up thoroughly with a wooden or silver fork.

Q. How soon may this preparation be applied to the glass?

A. In about two hours; the plate is then dried, and exposed to the fumes of iodine until it attains a golden tint it is then sensitised in a bath of—

Distilled water	280 parts.
Nitrate of silver	32 "
Crystallised acetic acid	80 "

It may immediately afterwards be washed, dried, and exposed in the camera.

Q. How is the picture developed?

A. In a warm solution of—

Distilled water	100 parts.
Gallic acid	7 "
Acetate of chalk	3 "

The glass must be plunged into this solution, and when it has cooled a few drops of the following should be added:—

Distilled water	100 parts.
Nitrate of silver	6 "
Acetic acid	20 "

Q. How is the impression fixed?

A. In a solution of hyposulphite of soda.

(*To be continued.*)

Correspondence.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY.

Sir,—I beg to be allowed to offer some remarks on the subject of the Exhibition just concluded. It is possible they may not exactly coincide with your own opinions, but, convinced of your impartiality in such matters, I do not think you will refuse them admission to your columns.

Of the Exhibition itself, as the articles you have published have exhausted the subject, I shall only observe that it proves how very little superiority one process possesses over another in the reproduction of pictures when the photographer is a skilful manipulator and an artist. The pictures on which I propose to offer some observations, are those exhibited by Mr. Rejlander and Mr. Robinson; I shall commence with the former gentleman.

Most of your readers will probably remember that when Mr. Rejlander exhibited his picture of the "Two Ways of Life," it excited a good deal of discussion; some objecting to it on the ground that it trenched on the province of the painter; others, that the attempt to depict an allegorical subject by means of photography, was ridiculous, and the result a failure; others, again, objected to it on the simple ground that the picture was an improper one. Now, I do not myself entirely agree with these objectors, though to a certain extent I consider that all of them are well-grounded. I did not forget that this was a first attempt to produce a photograph of such pretensions; and though, in the interest of the art, I should have been better pleased if the artist had chosen another subject, yet I could find an excuse for him in his desire to make a picture which should attract the greatest amount of attention; which might, however, have been attained sufficiently without placing an undraped female, whose attitude and expression were equally objectionable. Of course, I can anticipate the answer this remark will elicit—"that impure minds alone conceive impure thoughts from gazing at a work of art," &c. &c. But, as I have already said, there was some novelty in the idea, and I am not disposed to find fault with the artist on this score. What I complain of is, that his last productions should have been more objectionable than that to which I have alluded; and we think the committee might have made a better selection than these clever but objectionable pictures of Mr. Rejlander. In one of the inner rooms there hangs a frame in one corner of which is represented, or attempted to be represented, a man in the seventh stage of life; and in the opposite corner, a hideous object, which I at first took to be a representation of the Gorilla, but which closer investigation led me to conceive was intended to convey the notion of a madman; and a more revolting object in the form of a human being I never saw: but in the centre of the frame Mr. Rejlander has taken care to give the eye of the spectator some relief by a photograph of the beautifully formed figure of his model, artfully posed, so as to *force* the attention of the spectator to objects which would not fail to attract his notice under any circumstances. With respect to the two first figures, I do most strongly protest against these representations of humanity under its most humiliating aspect. If it were the inevitable lot of man to become mad or doting, it would be a different matter, the picture might convey a moral lesson; but as we do not habitually lose our senses, nor, as far as my observation extends, invariably or commonly become dotards in our old age, such pictures are simply monstrosities, and, to say the least, are neither true to nature, nor agreeable to look at.

In the next room there is a picture by the same artist intended to represent, the infant "Mewling and Puking in its Nurse's Arms."—no, I mistake, not in its nurse's arms, but on a table, or something of the sort; its nurse is standing by, her whole attitude and demeanour offensive to good taste. Such are the pictures which a committee of the Society have thought deserving of a conspicuous place in the Exhibition, and such are the pictures which a photographer—whom we all know to be capable of producing more beautiful things in this line than almost any other man—has thought good enough to send to the metropolitan exhibition.

I now proceed to offer some observations on one or two of Mr. Robinson's pictures, and chiefly on that which has been, in my opinion, so greatly over-praised. I need hardly say, I allude to that known as "Fading Away." If Mr. Robinson had done nothing more of this kind, I should not have thought it necessary to pass any strictures on a solitary instance; but when I see the same figure represented in the last stage of consumption under the title of "She never told her Love," I cannot but recognise a species of trading on the most painful sentiments which it is the lot of human beings to experience. In the first picture there is a manifest want of refinement and artistic feeling. The absence of expression in the mother's countenance, of which so many critics complain, is not evident to me; on the contrary, I can readily conceive that a mother who had been accustomed for weeks, or months, to see her child slowly dying, and who had a firm conviction that the separation which was about to take place was only for a time, and that she would soon meet her again in a world where death could not enter, *would* acquire that calm expression; neither do I object to the expression of the young woman who is looking down upon the poor dying girl's face: but I *do* object to the introduction of the burly figure who stands with his back towards the spectator. Speaking artistically, he is a great blot in the picture, which would be infinitely better if he were absent; and looking at his presence there from another point of view, it must be offensive to every right-minded person. The sentiment which his presence is intended to convey, is one which a true artist would only have hinted at afar off. and the prominent manner in which it is thrust before us in this photograph, is only suggestive of a desire to "pile up the agony." Now, a death-bed is not the place for indulging such a sentiment, and if it existed in reality it should have been kept out of the picture. Moreover, in the present case, it excites disgust rather than any other feeling, because the poor little sufferer is evidently a mere child, and could never have been looked upon in any other light.

Mr. Robinson does not, like Mr. Rejlander, appeal to the passions, but to a kind of morbid sentiment; and it would be difficult for him to have chosen a subject calculated to excite painful emotions in the minds of so many persons in anything like the same degree. How few there are among us who have not to lament the loss of some dear friend or relative by this terrible disease, and whose recollections, and consequently painful emotions, are revived with such intensity as to make their visit to the exhibition a source of pain instead of pleasure. Mr. Robinson was, doubtless, well aware of the extent to which a picture of this kind would appeal to the sensibilities of the spectators, and I am forced to believe that it was this knowledge which led him to carry his conception into execution.

I trust the gentlemen whose pictures I have referred to will not imagine that I have been actuated by any personal motive in singling out their works for condemnation. I have not the slightest personal knowledge of either; nor any desire except to see a stop put to the more extended production of such subjects. I wish to express the high opinion I entertain of their abilities as photographers, and to advise them to confine their practice to the reproduction of subjects which the public may look upon with pleasure. At the same time, if they continue to give us works of this kind, I hope the council will pause before they allow them to be hung at any future exhibition; and if Mr. Robinson and Mr. Rejlander were to remove the objectionable pictures at once from their public prominence, they would act wisely, and such an act would be advantageous to their reputation.—I am, Sir, your obedient servant,

An *Ex*-Member of the Council.

THE WET *versus* THE DRY PROCESS.

Mr. Editor,—Your "News" might well be called "The Practical Photographers' Guide," it abounds with so much that is really useful. I always preferred the practical to the mystic theoretical. From my infancy, it seems, I have been fond of it. One instance will suffice. When but a child and some repairs were being done in my father's house, having heard the plasterer say to his man that there was not enough of hair in the lime, I very coolly took my younger brother into a room, and, with a pair of scissors, clipped off his hair, without the least regard to his personal appearance, and supplied them with the desideratum.

When Fothergill's dry process came out I gave it a fair trial, and the first view (Glasgow Harbour, 8 × 10) was so excellent that I prepared a number of 8 × 10 plates by that process, and my friend Mr. W., another member of our practical society (a very successful Hill Norrisite), prepared a number of stereoscopic ones by his mode, and we started on a photographic tour to the far-famed scenery of the "Lady of the Lake,"

> "*In autumn*, sae pensive, wi' yellow and grey."

We left Glasgow in the afternoon and got to Killearn—stayed all night at Deacon W.'s—started next morning in his dog-cart, accompanied by two friends—went by the Aberfoyle-road—passed through the bustle and excitement of digging, building, and laying the huge pipes of that gigantic undertaking—the conducting of the Loch Katrine water to supply Glasgow for domestic use—passed Gartmore mansion and arrived at the "Clachan" of Aberfoyle, of Rob Roy celebrity, when we took view No. 1, viz., Aberfoyle Inn, with a harvest-field foreground, Lockard, &c., in the distance. After some refreshment, we found that the spring car (for the hills) was engaged by an English lady and gentleman, but who kindly allowed our traps to go with them to the Trossachs. The day being fine, we left our overcoats, and with tripod in hand we took our journey across the hills to our base of operations, the "Trossachs." The views which could be taken on the road are endless, and truly magnificent; and when Lake Vennacher broke on our view, and then Loch Achray, we were perfectly entranced—

> "So wondrous wild, the whole might seem
> The scenery of a fairy dream."

On looking behind us we saw the spring car jolting and toiling on, and we were fully half an hour at our destination before it. After getting our traps out, and thanking them for their kindness, we set out for work,

> "Where the rude Trossach's dread defile
> Opens on Katrine's lake and isle."

Picture No. 2. View from right of the ferry-house, looking down Loch Katrine, &c., with our two friends disposed in the foreground. While here, a young English gentleman unfortunately pitched his camera rather near the road, for, while standing watch in hand, half-a-dozen coaches with tourists rushed past him one after the other, turned, and re-passed him, to wait the arrival of the steamer's passengers for Cullender. He had, likewise, a further annoyance, in a silly lad (who was more knave than fool) selling Highland nuts, who would always place himself in the way of the lens; a silver sixpence, however, opened up his comprehension at once, when all other modes failed. One of our party kept him out of our way, by pretending to drive a hard bargain with him, till we had done—he being done at the same time. Picture No. 3, from a little way down the loch, taking in the ferry-house, Ben-Venne, and the foot-path, our two friends arranged on favourable points for the picture. Whilst exposing, a joyous party of young ladies, with their father, passed, which considerably chagrined our friends, who flattered themselves on their judgment of female beauty, but couldn't turn round to catch even a passing glimpse of these "ladies of the lake," but stood rivetted to the spot, as if biologised, while we could scarcely keep our gravity at their position; and they were wild when we told them that they were perfect specimens of English beauties. After taking Ellen's isle, and a few others, the sky got suddenly overcast, and a few drops of rain fell, and then there fell such a torrent, it fairly deluged "fairy land," and we had to run for it. At Trossach's Inn we found the spring car ready, which had been engaged to take us back to Aberfoyle—in we went;—

> "Across the stream we took our way,
> That joins Loch Katrine to Achray."

And then across the mountains, the rain, if possible, getting worse. On ascending the first hill we had all to come out and walk, it being so steep, when our two friends set off to "walk it" home, while Mr. W. and I drove and walked, as necessity required, with our coat-collars turned up, and our focussing cloths over our shoulders (many a time were they wrung dry, and donned again); at last we got to Aberfoyle Inn. Although thoroughly "droukit," we kept up our spirits wondrously, and had many a hearty laugh, although sometimes on the wrong sides of our mouths. Two of our party took off boots, stockings, and trousers, to get them dried at the kitchen fire; the one had on drawers, and looked queer enough, but the other, not having on such nether garment, looked queerer still; and we laughed outright when he complained of the rough haircloth seat. After a *petit verre d'eau de vie*, and a "tousie tea," we got, so far, comfortable. Our dog-cart was now ready, but poor Mr. R. could not get on his boots, and had to get his feet and legs wrapped up in straw, and to be lifted into his seat of honour, as our "Jarvie." Being all seated, and having lit our cigars, away we started for Killearn, where the Deacon's wardrobe afforded us a complete transformation from top to toe. When we got into the dining room to tea, some friends were there to meet us; and, there being some good pianists present, we tripped it on the light fantastic toe, and chased away any casual acquaintance we might have formed with Master Rheumatism. Many a time that night we mistook each other's identity, in our new habiliments. Next morning we started home to develop our resources. Nothing appeared but haze—the resinous effects of the pine boxes which contained our plates, and the saturation with rain, had completely ruined them.

Having given my first campaign with the dry process (although the wettest I ever experienced), I feel inclined to abide by the wet. I have no difficulty with it, and always satisfy myself with a picture before leaving the spot. The dark box described in vol. i., p. 297, comes nearest the one I use, but mine can be folded up like a portfolio, and is mounted on a perambulator, which also carries a necessary supply of eatables as well as chemicals, &c.

Some of our practical society intend exchanging the pictures they take this season with those of other kindred spirits, so as to vary their portfolio.

In the prosecution of the delightful art of photography there occur so many amusing incidents, that I have commenced making a collection, and shall be happy to receive such as any of your readers may feel disposed to send.

4, *St. Enoch-square, Glasgow.* A. Mactear.

Miscellaneous.

The Glasgow Photographic Society.—The above society contemplate holding an exhibition during the course of the next month. In the prospectus issued by the joint secretaries, we are informed that not more than twenty specimens will be accepted from one single exhibitor; and those who contemplate contributing, are ordered to send their contributions before the twentieth of this month. The other regulations may be found in our advertising columns, and are similar in character to those at other exhibitions. We recommend this to the notice of photographers.

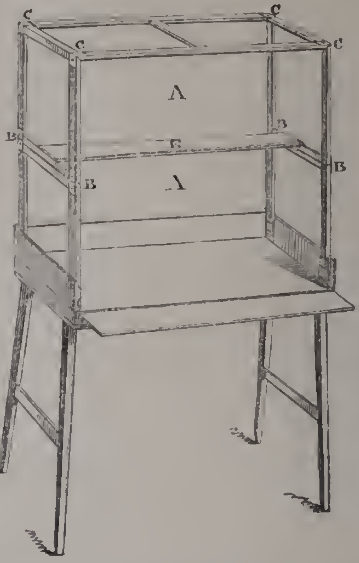
The Late Mr. Johnson.—The *Times* has announced, within the last few days, the death of Mr Johnson, the chief of the Radcliffe Observatory; and, in doing so, has spoken of his character and acquirements with well-merited eulogy. Having ourselves been engaged with him in carrying out the arrangements for recording certain meteorological phenomena by means of photography, we were necessarily brought into intimate contact with him for a considerable period; and, in recording this painful announcement of his death, we have a melancholy satisfaction in bearing testimony to the justice of the observations of the *Times* with respect to his private worth, and his exalted scientific attainments.

How to obtain Photographs of the Moon and the Inhabitants thereof.—We were not a little amused by an announcement which appeared in a very serious foreign contemporary to the following effect:—"Suppose that a successful attempt were made to obtain a surface for the photographic picture perfectly free from irregularities capable of distorting the most imperceptible lines of a photograph. Suppose also that on this surface a photograph of the moon were taken with every precaution; if this picture were examined under a very powerful microscope the most minute details would become visible, and if the instrument possessed sufficiently high magnifying power you would be able to see living beings, if there are any residing in that luminary. This is one of the applications of photography to astronomy; and it has been said that an Italian *savant*, after trying for six years to obtain this result, has succeeded, and has recently been able to obtain pictures of the moon on which figures of naked animals are depicted, one species of which bere a great resemblance to human beings. . . . . It is certain that important discoveries may be arrived at by this means; the great difficulty being to find a substance on which to take the picture, the surface of which shall be so perfectly even as to receive the luminous image without in the slightest degree distorting its most minute details."

Photographic Notes and Queries.

PORTABLE DARK TENT.

Sir,—At pp. 273 and 284, vol. i. of the "Photographic News," you give plans for portable dark rooms, which I do not think as convenient, in every respect, as one I contrived some months ago—and which, with your permission, I now beg to lay before our readers.



It is all contained in a flat box, 26 inches long by 16 wide, and 5 deep, *inside* measurement, made of light ½-inch pine, weighing about 6lb., and is carried by a strap and buckle.

The top or lid taken off, it has an overlapping ledge all round to keep out dirt; on the under surface of it two trussels are hinged, which turn out; and, being kept expanded by hooks or rods, it forms a very nice table, standing about 24 inches high.

On this table the box is placed; the front of it falls down on hinges, adding 5 inches to the length. Two light frames are made, 25 inches long by 15 wide, like figure A; these are cut and hinged at B B, so as to fold each into *half the length*. One of these frames is then hinged on the bottom of the box at each end, the hinges B B meeting in the centre, and so that each frame can be raised to its full height, 25 inches, so as to form the ends of the chamber. A third light frame, to form the roof, is then made and hinged at C C, to the ends, so that the whole lies flat in the box when shut up, or forms the frame of the chamber when expanded; this chamber will be 25 inches square by 15 wide, or deep, from front to back. When expanded, it is kept upright by hooks and eyes, or, better, by a slip E of deal 2 inches wide and 25 inches long, extending from one end frame to the other, at the middle hinges—this slip forms a convenient shelf for the plate-holder, collodion, bottle, &c.

When constructing these frames, provision must be made for the yellow glass windows, either on ends or top—mine are in the upper half of the two ends.

Well, when this is so far complete, expand your framework to its full size, and neatly cover the top, ends, and back with any *light-proof* material—mine is waterproof alpaca—nailing it closely on the frames, and to the bottom of the box, all round the ends and back; and, cutting out the spaces for the windows, put in the glass, and paste your cover over them, for, say ½-inch all round.

You then have a dark chamber, open in front with yellow glass windows, according to fancy, in tops or ends. Then, take 102 inches long of black glazed calico, and the same of yellow, lay them one over the other, and join the ends so as to form an endless roller, 100 inches long; nail one selvage of this roller *inside* the front of your chamber to the frames, and to the bottom, taking care not to let it interfere with the shutter of the falling front. On the other selvage of the roller, you form what ladies call *a casing*, in this you pass a *strong* elastic tape or ribbon, say 20 inches long. You thus have a *hood* hanging in front of your chamber, whose length is the breadth of the calico, say 30 inches, attached to one end of the frame and bottom, and with an extensive mouth, into which you insert your head and arms, allowing the hood to come down nearly to the waist, and in this you work most conveniently.

By removing the shelf, slip E, and allowing the chamber to fold up, you will see how beautifully the whole subsides into the box—the ends folding on themselves, whilst the top goes down horizontally, the back puffing out behind; you then fold up this back, and also the hood into the box, shut up and hook the falling front, fold up the tressels of your table, put it over the open box, buckle your strap, and move off to your next station.

Of course your baths, bottles, &c. must be taken out before you shut up the chamber. I prefer carrying those with camera in a second box,—but, if thought more convenient, the five inches depth of the chamber box might be gained by bringing the end frames higher up, so as to give room for baths, &c. *under* the frames when closed.

M. Esmonde White.

NOTES ON DISHES, TENTS, &c.

Sir,—If "Photo. beyond Railways," vol. i. p. 299, were living anywhere in my neighbourhood, if I could I should be very glad to help him, but I am afraid it is not in my power to send lists (for your approbation) such as he mentions at p. 299; for although there are certain broad rules to be observed, such as conveying the whole and sole use and enjoyment of certain baths, dishes, funnels, &c., to hypo. solutions for ever, yet, when we have to descend to minutiæ, then the only rule I know is to trust to one's common sense; when this fails any one, they now have a sure remedy (as I know from experience) by writing to "The News;" but, let them first tax their own ingenuity and thoughts, for their future benefit and your relief. A slate pencil never occurred to me; when glass rods or tubes were not forthcoming, I turned to the bundles of reed in the loft; but it has now suggested to me the idea of slate baths, which I mean to try.

May I say a word or two of my experience in tents and similar contrivances? I have purchased and made six, and have well tried them all. I do not like those which are entered by an elastic or running string round the waist, as described at pages 190 and 284. Those similar in principle to the ones described at pages 179, 297, and 305, are not large enough for work, if made larger you can't reach from one end to the other; and, further, the moisture from within gets condensed in warm weather on the inside of the glasses, and then it prevents all view of the development of the picture. I have now discarded all but one, which is similar to that described at p. 10, and which was the first I had. I have a box which holds all the apparatus except the legs; this, too, forms a seat inside (when in use). The usual camera tops I found too close at the top, so I employed a blacksmith to make an equilateral triangle with joints at two corners and a screw at the third, so that it folds up together; the sides are 18 inches long: then a chimney, shaped like a magic lantern, to exclude light and to ventilate; so my field roll is simply—

Two stands and screws.
Box with—
    Camera and lens.
    Case of bottles.
    Focussing cloth and glass.
    Slide.
    Bath cover and dipper.
    Water cistern.
    Plate box and plates.
    Cleaning cloths and chamois.
Tent cover and top.

If you should deem this (which is, though, too long) or any part thereof worth publishing, it will be, my dear sir, from yours gratefully,

H. S. I.

STEREOGRAPHY.

Sir,—Much has been said and written respecting the stereoscopic angle, and the point appears as far from settlement as ever. Having in stereoscopic work always taken my pictures on what may be called the parallel system, a note from the experience of a hard-working photographer may be useful to those who, like your correspondent J. W. W., wish for information on the subject. I commenced like many others by taking both pictures at once with a twin lens camera, but this, however correct in theory, did not give sufficient relief to satisfy customers, and I was told by cunning photographers that to give satisfaction I must either use one on parallel laths, or two cameras placed at a distance from each other,—in which latter case I must be careful to get the right angle. Neither remedy exactly suited me, and, thrown back on myself, I adopted the most simple of simple contrivances, which answers the purpose admirably: it consists merely of a piece of board, two feet long and the width of the camera, with a ledge $\frac{1}{2}$ of an inch high, to prevent the camera slipping off, and marked with scale to show the distance of lenses from each other. The *modus operandi* is as follows: having screwed the board on the stand, the camera is placed on, and the view focussed; a glass $6\frac{3}{4} \times 3\frac{1}{4}$ is prepared, and the camera placed in position for the left-hand picture; the left cap is then to be removed, expose the necessary time, and then replace the cap; push the camera along the board to the position for the right-hand picture, take the right cap off, expose, put the right cap on, and remove the slide to operating tent. The time taken to cap the left, shift, and uncap the right lens is three seconds; at this time of year both pictures may be taken in 50 seconds,—as a proof of the result, I send you three specimens for inspection. Nothing can be cheaper, or more convenient, equally adapted for one lens or two, and the extra apparatus (or board rather) is such as can be fitted by any photographer—amateur or professional.

Campden. S. T.

MR. LYTE'S NEW GOLD TONING BATH.

Sir,—I have tried the new process of toning by Mr. Maxwell Lyte (vol. i. p. 301), and enclose you a print toned in less than five minutes: the whites are beautiful, compared with the old system. In printing, I found that a properly exposed paper toned the best. The change in the new bath is really magical. I, for one, must give Mr. Lyte great praise, in thus giving to the world his labours. I tried an underprinted positive, and was much gratified in seeing it change to a beautiful purple tone, and great vigour; but it required a longer time in the bath. J. B——x.

[Judging from the specimen sent by our correspondent, the toning bath above alluded to leaves scarcely anything to be desired.—Ed.]

PROPOSED REGISTER OF VIEWS FOR PHOTOGRAPHERS.

Sir,—I have long wished to see a correspondence started in your columns, having for its object the collection of information as to which architectural subjects are photographically possible; say—Cathedrals: some are not at all possible; some are partially, others wholly, admitting several views. I and another amateur or two here wish to have a cathedral tour in the summer, but we don't know where to begin—100 or 200 miles might be traversed, and no view possible. Such a correspondence would be eagerly sought after by your readers, I humbly think, if it could be started. One cannot take the opinion of others than Photographers, and they are few and far between.

I have bought lithographs and engravings, but I have learned to put no faith in them; the artists give splendid foregrounds, and acres of space, for which they have "drawn" upon their "fancy." The information need not be confined to cathedrals, the various railway lines might be alluded to, giving the architectural or other subjects on any given route, &c. W. W.

THE SUPPOSED "NEW ACTION OF LIGHT."

Sir,—I have just seen your observations on M. Nièpce's discovery of "A New Action of Light," which certainly *appear* to establish the fact, that *actinism* has nothing to do with the effects produced by the experiments with tartaric acid, &c.; perhaps it may be of service to you in your future investigations if you were to use a mixture of solution of bichloride of mercury and oxalate of ammonia, in a glass tube, in place of the sensitive chloride of silver paper, as this solution, although as sensitive to actinism as Ag Cl, yet is not influenced by heat. I have tried the mixed solution in the tin tube, with a view to obtain a result with absorbed actinism, but was unable to do so. Perhaps your idea may account for my failures. Robt. John Fowler.

13, *Briggate*, *Leeds*.

ANSWERS TO MINOR QUERIES.

Decoloring Collodion with Metallic Mercury.—*Chemicus*. In addition to the methods of decoloring old red collodion with metallic silver, cadmium, zinc, &c., we have found that metallic mercury will answer the purpose very well. The liquid nature of the metal, and its affinity for iodine, cause it to be well adapted to this purpose. A globule the size of a pea may be poured into a few ounces of collodion, and if briskly shaken for a few minutes, the metal will be diffused through the liquid in the form of an impalpable powder, which soon seizes upon every particle of free iodine present, whilst its great specific gravity causes it readily to sink, and leave the supernatant liquid clear.

Chemical Symbols.—*H. S. I.* In chemical symbols a + and *comma* do not mean the same thing: when + divides two compounds, it means that the two are separate and distinct; each possessing its own peculiar properties: when, however, the same bodies are separated by a comma (or, as we prefer, by a full stop), it means that they are united together chemically to form a third substance possessing new properties, in which the distinctive characteristics of the two from which it is produced are gone. Thus the equation—$3\,SO_3 + Fe_2\,O_3 = Fe_2\,O_3 . 3\,SO_3$ is not the same thing as the algebraical equation $a + b = b + a$; but it means, 3 parts of sulphuric acid SO_3, added to 1 part of sesquioxide of iron, will produce 1 part of sulphate of iron. On the one side we have a mechanical mixture, and on the other a chemical compound.

Specific Gravity.—*A Pupil* sees frequent references in our columns to the specific gravity of a substance, and asks how he can take the specific gravity of a body. Let us suppose that the substance in question is a piece of iron; hang it to the bottom of a scale pan by as fine a thread of unspun silk as will safely carry it, now weigh it accurately hanging in the air, and afterwards place a tumbler of water under it and see how much it weighs when the piece of metal is completely immersed in water. Then divide the weight in air by the difference between the air and water weighing, and the result will be the specific gravity. The following is a general formula, which will be found very useful:—

Let w = the weight of the substance in air
" w' = ... water.
$\therefore w - w'$ = the weight of a bulk of water equal to the bulk of the substance.
then $w - w' : w :: 1 :$ Sp. gr.
or Sp. gr. $= \dfrac{w}{w - w'}$

In very accurate experiments it is necessary to take many precautions, such as employing the water at a particular temperature (60°) &c, but these would belong more to the domain of the higher branches of chemical physics than photography, as in the latter science such extreme accuracy is seldom required.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Lux.—We have continued the experiments mentioned in our last number, but have hardly yet brought them to a sufficient point for full publication. A piece of sensitive chloride of silver paper was stretched over the mouth of a test tube, in which some pure distilled water was kept boiling: in about two minutes the paper had darkened considerably, showing that *heat* (and perhaps aqueous vapour) was capable of exerting a similar action to actinism. We have since shown that aqueous vapour is not necessary, by fastening the sensitive paper round the outside of the test tube close to the glass: it darkened in this case also, though not so rapidly as in the former experiment. A third experiment was tried as follows:—A strip of thin printed paper (torn from a hand bill) was screwed close to a piece of sensitive chloride of silver paper in a pressure frame, the piece of hand bill serving as a negative. The frame was now exposed for some minutes to the heat from a vessel of boiling water, and the result was a reproduction of the paper used as a negative, but in *its true light and shade*. The negative had, in fact, facilitated the absorption of the heat instead of obstructing it. We are still anxiously pursuing this new development of photography, and will, ere long, lay the complete results before our readers.

P. F. P.—1. Query inserted in full. 2. The plate should be allowed to dry spontaneously; if the varnish be a spirit varnish it should be applied with heat, but if the solvent be chloroform or benzol it should be applied cold.

W. J. W——n.—There was not quite enough iodide of cadmium in your bath to begin with: you should have added about 5 grains. If the bath is still foggy, add one drop of nitric acid; and, if that will not cure it, *sun* it as recommended in previous numbers. We are much obliged for your receipt, and will insert it with pleasure.

Zincib.—Try the toning bath given in the last number, vol. i. p. 301. The other information will be found on reference to our advertising columns.

Troublesome.—You cannot completely avoid the nebulous outline round objects, unless you use a good lens: it may be diminished by using a small aperture to the lens.

An Amateur.—Your prints are very clean, and if the negatives had been developed longer they would have been very good. Try the toning bath at vol. i. p. 301.

Zetetic.—Some other solution must have found its way into your silver bath, otherwise it could not have deposited a thick black precipitate in perfect darkness: most likely a little hypo. has found its way in, and in that case the precipitate would be sulphide of silver. Add a few grains of metallic cadmium, boil violently for some minutes, then filter, and add a few drops of acetic acid; that will most probably prove an effectual remedy.

S. and H. Patey.—Try some other variety of English photographic paper. It is quite a chance getting perfectly good paper at first, but a little experience in the different varieties will soon show you which is the most preferable for your purposes.

Positive.—See answer to "An Amateur."

Self-taught.—Filtering the collodion would prove an effectual remedy against the spots; but if it requires thinning afterwards, a mixture of four parts ether and one part alcohol, both perfectly pure, should be added: your fault consisted in not using pure ether. The remedy for your *colouring* difficulty has been pointed out in our "Lessons on Colouring." Acetic acid in a bath is less likely to cause insensitiveness and faintness than nitric acid, if used in rather too large quantities.

Pyro.—A great noise was made some time since about the new metal aluminium, and if it could be obtained at a small price it would be invaluable. As a substitute for brass work in the camera and lens fittings, its very low specific gravity and great strength would make its employment a great saving to travelling photographers; and even at its present price (about 7s. 6d. per ounce), it might not be too expensive for some amateur photographers.

M. Wane.—A print should not remain in the fixing bath for a less time than ten minutes or a quarter of an hour; indeed, a rather longer time would be preferable in cases where the bath did not enfeeble the print too much.

Desperata.—Rub the stains with a lump of cyanide of potassium dipped into water, and they will vanish.

E. H. F.—1. The lenses you name are excellent. 2. We do not know the exact proportions he uses, but should think 20 grains to the ounce would do. We are much obliged for the interesting communication on the stereoscope.

Beta.—1. Photographic instrument makers sell small eye-glasses for focussing with. We should recommend you to try one, as it might remedy the inconvenience you allude to. 2. See Mr. Doubleday's canvas tent, recently described.

A Subscriber from the Beginning.—We do not at present know of a better plan, but are experimenting on the subject, and hope shortly to be able to give a different and superior process.

Lux.—The tin box should not be blackened inside. Was your box well cleaned out? Take six times as much Beaufoy's.

J. Brown.—The only suggestion we can offer is, that the glasses were not properly cleaned.

G. C.—An ordinary spectacle lens is the one which is intended to be used.

J. B——n.—1. We will describe a plan in an early number. 2. They would not be so applicable to the wet collodion process as to the one there alluded to. 3. The one you call P. is the best. 4. They are not made of sufficiently short a focus. We are glad you like the toning bath: your print is excellent

A Hardworking and Practical Amateur.—Received with thanks.

Communications declined with thanks:—Brass.—Fix.—A. G. B.—Hypo.—C. S. L.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Chloride.—Asmodeus.—Dr. X.—S. Y. O.—H. P. R.—Hypo.—Eusebius.—A Photo.—Old Hypo.—Pitt.—C. O. A.

In Type: H. Bellini.—O.—J. R.—W. Cochran.—C. Heisch.—P. F. P.—Suggestor.—R. H.—P.—D.—T.—X P. R.—B—A. N.—W. W.—A. B.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 28.—*March* 18, 1859.

PHOTOGRAPHS AND THE "BOOK POST."

It is not without some little degree of surprise that we read a letter addressed to us by "A London Firm," and which will be found in another column, on the subject of the "Book Post," and the regulation regarding Photographic Works. We are sure that all our readers will share that feeling when they learn, for the first time, that if they have hitherto sent photographs through the post, they have done so on sufferance only. The case is one of the utmost importance, and while the public mind is still agitated by the recent arbitrary regulation, now happily repealed, regarding the pre-payment of letters, it behoves photographers to look to their own interests, and see that they are put on an equal footing with other publishing trades. We have, hitherto, been accustomed to hear of, and see, so much liberality on the part of the Post Office authorities, that we cannot understand their availing themselves of the quibble "Photographs are not Books."

In the *British Postal Guide*, containing the chief public regulations of the Post Office, the following definition of "printed papers" occurs (as applied to foreign countries) :—"This includes Parliamentary proceedings, books of every kind, whether printed, engraved, or lithographed, sheets of music, prints, and printed and engraved maps, with any binding, mounting, or covering (whether loose or attached), belonging to any book, &c., and any cases or rollers of prints, or of printed or engraved maps, together with book markers, pencils, pens, or other articles usually appertaining to any such book, &c., or necessary for safe transmission. But no such book, &c. (unless it be for Sardinia, in which case writing, not in the nature of a letter, is allowed), must contain any writing or manuscript mark of any sort, and no packet must exceed eighteen inches in length, width, or depth (except those addressed to Sardinia, Spain, the Balearic or Canary Islands, Tuscany, Parma, Modena, and the Austrian dominions, which must not exceed 24 inches), otherwise it will be detained, and sent to the Returned Letter Office charged with letter postage. To Spain or the Canary Islands, however, bound books cannot be sent ; neither can prints, music, maps, nor drawings, unless they form a part of any publication included in a packet of printed papers." We have thought it desirable to extract at full length all that is said in reference to the "Book Post," and we can only say that there appears to us an omission of the word "Photographs." Why should engravings, maps, sheets of music, be more highly favoured than Photographs? Certainly it cannot be urged that "sun pictures" are among the "forbidden articles" alluded to in p. 21, where "the Postmasters are instructed not to receive any letter, &c., which there is good reason to believe contains anything likely to injure the contents of the mail-bags, or the person of any officer of the Post Office." We find that among the "forbidden articles" are razors, scissors, needles, knives, &c., &c., but no mention of Photographs.

We have read the letter of our correspondent carefully, and can only arrive at the conclusion that the excessive charges of which he complains are to be attributed to a misunderstanding on the part of some clerk, either in the postal service of this country or abroad, and that when the subject is fairly brought before the authorities of St. Martin's-le-Grand, they will at once give permission for photographs to circulate like other printed matter. It will be seen that, with the exception of one slight deviation from the postal regulations, our correspondent has complied with all that is laid down ; and we hope that the question which has now been raised will not be allowed to drop until photographers are put on an equal footing with other publishers.

THE SENSITIVENESS OF CHLORIDE OF SILVER TO OBSCURE RADIATIONS.

[We have great pleasure in laying the following interesting and important communication before our readers. The name of Mr. Spiller must be well known to all photographers; suffice it, therefore, for us to say that, having had the good fortune to be for many years one of his most intimate friends, we can put implicit confidence in the accuracy and care with which the experiments were performed, as well as the soundness of the deductions which he has drawn from them.—Ed.]

March 12, 1859.

Dear Sir,—I have read with much interest the several accounts in your journal of the experiments of M. Nièpce de St. Victor, by which he has been induced to attribute a new agency to sun light. These, together with your own remarks, and those of M. Chevreul, have persuaded me that many important conclusions will result from a fuller investigation of the subject ; and inasmuch as it may be thought desirable to place on record any experimental contributions tending to throw light on this interesting question, I transmit the following facts for your consideration :—

Some years since, while engaged in photographic printing, I attempted to preserve for future use a few small sheets of sensitised chloride of silver paper by inserting them between the leaves of a printed book, and then putting them away in a dark closet, the shelves of which were also devoted to books. There they remained, forgotten, until an occasion for referring to the volume in which they were contained brought them again to remembrance ; and when found, after an interval of at least a year, they presented a darkened appearance similar to that resulting from a prolonged but partial exposure to light as in their ordinary application. The printed characters on the pages with which they were in immediate contact were distinctly rendered on both sides of the prepared photographic sheets inclosed between them ; while at the same time it should be stated that there was no evidence of this result being attributable to the direct passage of light *through* the printed leaves on either side, as in that case the impressions would certainly have been rendered somewhat obscure from the interference of the pages of type contiguous to those actually copied.

The specimen, which I inclose, bears on the prepared face of the paper a fac-simile of the type represented in bronze characters on an iridescent ground, of which perhaps purple is the prevailing colour, and is as distinctly legible as the original pages of the "Reports of the Juries on the Great Exhibition, 1851," from which it is copied, with exception, of course, of the direction of the reading being reversed. The other side of the paper, presenting but different shades of dark grey, is, from the want of contrast in colour, not so well marked, although it clearly informs us how certain materials for candle-making are purified by the "bleaching agency of sun light."

These results, obtained long since, induced me more recently to study the earlier phases in the change of which the foregoing is the ultimatum. Accordingly, about three months since, some squares of sensitive, albumenised, chloride of silver paper were introduced between the pages both of old and recently printed books. At present the change is not sufficiently advanced to infer more than that the process of transfer is slow under the existing circumstances, and that the darkening commences in contact with the printing ink, and not against the white paper—a result at variance with the supposition that the latter had absorbed by preference, and is now giving out, the active principle of sunlight. These facts, coupled with the observation that the oldest printed pages appear to be the easiest transcribed, constitute all that can safely be stated at present in respect to these remarkable phenomena; and whether they are due to the accelerated decomposition of the silver compounds in the sensitive paper by contact with the carbonaceous or oily matter of the printer's ink, or whether they must be attributed to an action of heat, as suggested by yourself in a recent issue of your journal, still remains, I think, for future experiments to elucidate.

I am, Dear Sir, yours faithfully,

Chemical Department, JOHN SPILLER.
Royal Arsenal, Woolwich.

PROPOSITION FOR EXCHANGING STEREOSCOPIC PICTURES.

ON the 8th of April we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures, with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed a picture be forwarded with it.

We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score.

The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

DRY AND WET COLLODION.

BY M. L'ABBÉ DESPRATS.

THE subject we are about to consider is one which presents considerable difficulties; under this head we might, in fact, include an elaborate essay on collodion, but our aim is scarcely so elevated; our intention being simply to point out certain facts, which have presented themselves in the course of the numerous experiments which our leisure hours have allowed us to make, and the conclusions which may be drawn from them.

Before going further, we may be allowed to make a few remarks on a question which still continues to occupy the attention of photographers, viz., dry collodion. We have seen, with great satisfaction, that the ideas we have published on this important subject during the last two years have attracted the attention of inquirers. Certain dry collodions have been introduced into commerce, which are no doubt excellent, but the formulæ for them are kept a profound secret. We don't complain of this; it is no affair of ours.

The strongest impulse given to photography in recent times is incontestably derived from the discovery of collodion. The admirable results obtained by the use of this valuable agent have excited the emulation of numbers. Its action, however, is capricious. An amateur sees, with surprise almost amounting to stupefaction, the beautiful negative he has obtained almost without any assistance from himself; and the next morning he exposes a plate in the expectation that he is going to obtain an equally good result, and is both surprised and vexed that he does not. The sun may be as bright, the atmosphere as transparent, and his chemicals appear in equally good order; nevertheless his negative is an indifferent one, and so possibly are many succeeding ones. He does not know the reason of this, and possibly it may arise from different causes, but, unquestionably, the chief cause of failure is in the faulty composition of the collodion. If we may affirm that with a good collodion, sensitised in a good bath, a fair picture must necessarily follow, we may also say that, without these two conditions, the most able master in the art would be unable to raise himself above the level of the humblest beginner.

It is not our intention to enumerate here the different formulæ which have been successively published. All have their relative value, and all may be capable of yielding imperfect results, however carefully they may have been practised. The failure in this case has its origin in the impurity of the products used. How can we judge *à priori* of the good qualities of these? Science is on this point undoubtedly of great service; but every patient and careful observer may often supply its place by experience. The following observations may save many beginners from disappointments.

The bodies which enter into the composition of photographic collodion should be divided into two perfectly distinct series, viz.:—bodies compounded in clearly defined proportions, as bromides, iodides, &c., and those which, like alcohol and ether, admit of the forcible or accidental introduction of foreign matters into their composition, the effect of which is to modify more or less their proper and essential characters. To this latter series attaches a third body, gun-cotton, a substance as yet but imperfectly studied, a combination of bodies in variable proportions, and especially variable by reason of the presence of foreign bodies, which adhere to it with a great and prejudicial obstinacy.

With respect to the different iodides and bromides we have nothing to say; they may generally be obtained in commerce in a proper degree of purity; but the same cannot be said of either alcohol or ether, and more especially of gun-cotton. Of these three bodies, alcohol alone is obtained more frequently than the others in the state of purity which is absolutely essential. Nevertheless it is commonly associated with a varying quantity of water, but as the means employed in rectifying it in no way alter its nature, this product may be brought into excellent condition. Let us remark, however, on this subject, that absolute acohol is in no way necessary to the maker of collodion. Alcohol is the principal solvent of the iodides, and it would accomplish this but very imperfectly if it were anhydrous. In commerce we meet with several varieties of alcohol, but as far as the photographer is concerned there is only one in reality. The aroma which distinguishes them is too slight, too imponderable for it to exercise any notable influence on the effects to be obtained. We constantly use with equal success alcohols derived from all sources, whether obtained by the fermentation of wine or any kind of grain. We repeat, their principal quality depends on the degree of rectification to which the spirit is submitted. We shall find it necessary to return to this point further on, as it is one of some importance in the preparation of collodion.

The ether employed in photography is the result of a decomposition of alcohol by means of sulphuric acid; it is not therefore a natural product. It may by chance contain acid, in which case it must be rejected. It should therefore be ascertained by means of some sensitive re-agent, an infusion of red cabbage for example, that on this score it is without mixture. Sometimes, the acid reaction, which is masked by the vendor by means of an alkali, may change to an alkaline reaction; in this case the use of such an ether would be very bad indeed.

Finally, an ether which presents neither an acid or an alkaline reaction, and yet yields, nevertheless, but indifferent results, must be abandoned, and recourse had to another source of supply, until a good one is found, when it will be advisable to adhere to it. . . . .

And now for a few words on gun-cotton: its preparation offers no real difficulties; it only requires the most scrupulous care, such as manufacturers do not always bestow upon it. It has been advised, and with reason, to submit the gun-cotton to abundant washings, first with cold water, and afterwards with hot, in order to remove every trace of sulphuric acid which may adhere to it. But the gun-cotton, on its removal from the mixture which produced it, contains not only sulphuric acid; it contains also a large quantity of sulphate of potash, a very insoluble salt, crystallised and strongly agglomerated between the fibres of the cotton, from which it is extremely difficult to separate it entirely, and which can only be accomplished with certainty by repeated washings, during several hours, under a good stream of water. If it be desired to obtain palpable evidence of the freedom of the water used in the later washings from all salt or acid, it is only necessary to pour into it a few drops of a solution of chloride of barium; if the water be troubled, it contains one or both of these substances, most probably the former.

Perfectly washed and dried gun-cotton can undoubtedly be preserved in a well-closed bottle. For our part we preserve it rolled up in several sheets of blotting-paper in a very dry place. We happened to see in the possession of M. Durand, a distinguished photographer of Lyons, a specimen of gun-cotton, which had been supplied to him by a Paris house; and the examination of this specimen surprised us not a little. Having removed the cork which closed the bottle, we remarked that this cork was stained of a yellow colour, and corroded as if it had been exposed to the emanations from nitric acid; the cotton itself had the consistency and appearance of yellow paste; it was deliquescent, and gave forth a strong odour of deutoxide of nitrogen. M. Durand assured us that this was not the first time he had observed such a change, that it took place after the lapse of a very short time, and only yielded good results for a short time after he received it. We cannot assign the cause of such a deterioration; but we think there can be no doubt that greater care in its preparation would have prevented it; and we can affirm, from our own experience, that gun-cotton prepared with the same care as that which we employed will remain equally good, and without any real or apparent alteration, for an indefinite period.

It is not very long since M. Gaudin advised the manufacture of collodion from saw-dust. He thought possibly that by this means greater sensibility might be obtained. We had the idea of preparing pyroxiline from the silky down of thistle-down, and we obtained a yellow product of a feeble deflagration, and very slightly soluble in a mixture of alcohol and ether; but which, we may observe, notwithstanding its strongly shaded tint, was one of the best we ever made; it yielded, in particular, most admirable half-tones, but, as far as we remember, we did not remark any augmentation of sensitiveness.

Since we wrote the above nearly twelve months have elapsed; and since that time no very notable discovery has been made in this interesting branch of photography. It must be admitted, that this branch approaches very closely to perfection, if it has not already obtained it.

(*To be continued.*)

MICRO-PHOTOGRAPHY.

Dr. Müller speaks of a micro-photograph which had been shown to him, which was scarcely perceptible to the naked eye but as a faint spot on the glass; but which, on being looked at through a microscope was seen to be a full length portrait of the Emperor Napoleon III., in a military costume. We have seen another which represented the well known picture of the Queen and twelve naval officers in council; every feature of each individual being perfectly distinct on the application of a microscope of rather high magnifying power; although a threepenny-piece would have covered the entire photograph and something more. Mr. Alfred Reeves has recently forwarded to us a specimen of one of these minute pictures, which consists of a plate containing the portraits of the kings and queens of England since the time of the Conquest. Here, on a space not larger than the $\frac{1}{16}$ of an inch square, may be perceived a miniature "National Portrait Gallery" with a portrait of every king and queen surrounding her Majesty, who is properly made the centre figure of the interesting group. We have already referred on a previous occasion to some of the uses to which micro-photography might be put, but there are some others which we may briefly notice. Suppose, for example, that two portions of the same army are encamped at a distance of one or two miles apart, the communication being cut off by the enemy, or rendered almost impossible by the use of "arms of precision;" a very simple arrangement would enable the fullest written despatches to pass from one portion of this army to the other, without risk, and almost with the rapidity of electricity. The despatch is written, and a micro-photograph taken which reduces it within the limits of—if a long one—a square inch. This is placed inside one of the hollow conical bullets and the end closed with lead. The hoisting of a given signal would announce that a messenger was about to be despatched; and with the accuracy which distinguishes our improved rifles, a commander might have his despatches delivered with a speed and punctuality to which no post-office has yet attained. In the case of a beleaguered town, too, such a method of communication between its inhabitants and an army approaching to relieve it might be invaluable. It has not the drawback either of requiring men to have a special training for the purpose of carrying on these communications; all the manipulations necessary might be learnt in less than a week. Neither would there be any necessity for using a cipher, as there would be no risk of the despatch falling into the hands of the enemy, and hence there would be less chance of misapprehension of instructions than exists at present.

POSITIVE PRINTING.

Since the insertion of my short notice on this subject at vol. i. p. 86, I have had many communications requesting me to go into the detail, as numerous beginners could not gather from that all the information required to make a good photographic printer out of a perfect novice. In compliance with these requests I now proceed to give all the aid that I can.

The first thing required is a good paper, and as to this I can do little but repeat my former opinion.

To Albumenise.—Take any quantity of the whites of eggs not more than three or four days old, take away the germ and to each ounce add $\frac{1}{4}$ ounce of water and 12 grains chloride of ammonium, or common salt, as I find little difference betwixt the results. Dissolve the salt or chloride in the water before adding it to the albumen, and then beat up the whole for 15 or 20 minutes. I think the best way of beating the liquid is to get a handful of *small* well-washed gravel, and having put it with the albumen in a strong bottle (which must not be more than half filled), shake about violently for the above-named time; this method is very effective, and does away with the chance of uneven and streaky paper. The most common cause of albumenised paper not being uniformly coated is, that the albumen has not been sufficiently beaten, and consequently cannot flow off it evenly. The papers being cut to the required size, pour the prepared albumen through coarse muslin into the dish, and so you will get rid of the bubbles, and let it be ¼ of an inch deep at least; take the sheets and fold over one corner for half an inch, so that this piece will not come into contact with the liquid; then holding this corner in the left hand, let the opposite corner touch the albumen, and lower the top gradually whilst you pass the right hand lightly up the back, and so insure it touching the surface, there let it rest three minutes: if any air-bubbles appear on the surface they must be removed, as they would certainly cause streaks. After the above time, lift it by the folded corner and let it drain about a minute, then suspend it by the same corner, and having placed a very small bit of blotting paper for the albumen to drop off by, leave it about twelve hours to dry. Before putting it into the portfolio to keep, it should be thoroughly dried by the fire.

To EXCITE this paper, float not less than five minutes upon the silver bath made by dissolving 60 grains of crystallised nitrate of silver in one ounce of distilled water, adding 8 or 10 drops of acetic acid. This bath should be not less than ¼ inch deep, and when fresh silver solution is added to it, the strength of this additional quantity should be 70 or 80 grains to the ounce of distilled water, with 8 or 10 drops of acetic acid. The bath will be thus kept about its original strength, and so the prints will be vigorous, that would else be meagre and poor, without any boldness and decision. The very darkest shades, if the paper be good, will readily become bronzed when printing in the sun.

Here the operator must be told that, after being used a short time, the silver bath will grow discolored; this will not injure the paper until the liquid is almost black; then the operator may get about a drachm of kaolin, and mixing this with 4 or 5 ounces of the bath, violently agitate the bottle and leave it in the daylight a few hours, and then filter; this will restore it to perfect brightness. Another method of keeping the bath clear is to add to it about ⅕ of its bulk of alcohol, by which means some operators affirm no discoloring ever takes place, but I have never used this myself.

Of course, after excitement, the paper must be hung up in the dark until dry; when dry, if kept away from the light and air, it will keep very well for a week. I myself, after hanging it up in the dark room until dry, put the sheets together betwixt blotting paper, and so into an old letter book into the copying press, as if being copied, and press it very tightly; in this way I can keep the sheets rather more than a week.

THE EXPOSURE must be prolonged until the picture is darker than it is wished to appear when finished; as every sun-printing process becomes considerably lighter in fixing and toning. As soon as the sheet is taken out of the frame it should be immersed, and left an hour or two, in a large vessel of water to remove the free nitrate of silver from it, and then if the operator wishes to keep the sheet until he gets a quantity to tone and fix at once (which I always do), he can hang it up in a *dark* room for two or three days safely.

TO TONE AND FIX.—In a room where there is no more light than is necessary to watch the changes of colour, put your prints, after the before-mentioned washing, into a dish of water, to every ounce of which two or three drops of strong liquid ammonia have been added. Make a solution of chloride of gold of the strength of one grain to about 6 ounces, and add 20 or 30 grains of carbonate of soda. To make this solution, as I before recommended, it is best to dissolve 15 grains of chloride of gold, as it is sold in this quantity, in 15 drachms of water; then the amount of gold can be easily measured, as each drachm contains one grain of gold. After the print has been in the ammonia and water two or three minutes, immerse a few seconds in water, and immediately put into the gold bath; keep moving it about, and in some time between one and five minutes it will gradually change to a blue black; remove and immerse again about half a minute in water, and then into the fixing bath for fifteen minutes. The fixing solution is made by dissolving one ounce of hyposulphite of soda in six ounces of water.

I always think it safer to use a small quantity of this bath fresh each day on which I tone and fix a quantity of prints, as I always distrust hyposulphite solution which has been used before. After fixing, the pictures should be washed 24 or 36 hours, changing the water eight or ten times. Many of our high authorities recommend a much shorter washing than this; but, as has been before advised, let any man try to wash a piece of paper free from some coloured salt with which it has been deeply coloured, and although the salt may be a very soluble one, he will find that it is far more obstinate than he before imagined.

This, I think, is all that the beginner in photography need be told to give him as much aid in the printing process as words can; and here let me state my experience as to a movement there seems to be towards new applications of gold, and new mixtures in the gold-toning baths. I do not hesitate to say that most of these are very troublesome to concoct, some of them requiring to be kept at a certain temperature whilst being used, which is often no small inconvenience, and many of them (as the late French one) very expensive,—and what is the advantage in using them? My experience convinces me that not one of these methods is an advance in certainty, time, or good result. No process clears the whites, and yet does its work as to colour, like the simple alkaline chloride of gold; and some first-rate men of my acquaintance have returned to the above, after using the new methods for a short time. Again, as I stated before, it appears very plain to me that no acid should ever be applied to a print after it leaves the frame; and if a print is properly toned, fixed, and washed, my belief is that it is permanent *if kept dry and free from injurious gases.* Developed prints, I think, are really permanent, if properly executed; and if a good process of this kind were invented, it would be no small boon to photographers. Perhaps I may give my experience in this branch very soon, as I have long been engaged experimenting,—but this communication is simply in answer to those who wished a more minute description of the mode of printing mentioned at p. 86 in the first volume of the "PHOTOGRAPHIC NEWS."

O.

PHOTOGRAPHY IN THE SEVENTEENTH CENTURY.

"AT the same epoch an utopian, Thiphaigne de la Roche, discovered photography, not the photography of the present time, but that of the future, photography which reproduced colours as well as images; a perfected photography, in a word, such as will be discovered to-morrow, or in the course of a century. The description of the apparatus given by Thiphaigne is rather long, but it is too curious for me to resist the temptation to cite it at length:—

"'You know that the rays of light reflected from different bodies form a picture and paint these bodies on all polished surfaces, for example, on the retina of the eye, on water, on glass, &c. Elemental minds have sought to fix these fugitive images; they have composed a very subtle matter, very viscous, and which dries and hardens rapidly, by means of which a painting is made in the twinkling of an eye. They coat with this matter a piece of canvas, and present it towards the objects they desire to have depicted. The first effect of the canvas is that of the mirror, you see upon it reflections of all objects, far and near, from which the rays of light are reflected on its surface.

"'But that which a glass could not do, the canvas, by means of its viscous coating, can, viz., retain the phantom pictures. The mirror gives you a faithful rendering of objects, but retains none; our canvas renders them not less faithfully, and preserves them all. This impression of the images is the affair of a moment. The canvas is at once removed into a dark place and in one hour the sensitive film is hard, and you have a painting so much the more precious that no art can imitate its exactness. We take in the purest source, in the body of light, the colours which painters derive from different materials, which time never fails to change. The precision of the design, the variety of the expression, the touches more or less deep, the gradation of tones, the rules of perspective, we leave entirely to nature, which, with that steady progress which is its never-failing characteristic, traces on the canvas images which deceive the eyes, and makes reason doubt whether those things which we term realities are not another kind of phantoms which deceive the eyes, the ears, the touch, and all the senses at the same time.'"

The above extract is quoted from a work published by M. Edouard Fournier, entitled *Le Vieux Neuf*, and is said to have been written so long ago as 1670. We have no desire to wound the susceptibility of M. Fournier, but we must say that, without seeing the original MS. of 1670, we find it very difficult to convince ourselves that the art of photography existed in such perfection at that date. It is absolutely impossible to believe that the knowledge of such a wonderful art would have been suffered to die away, especially as the date when it is said to have been practised is comparatively recent, and hundreds of volumes of books, written at and long previous to that date, still exist, none of which make any mention of it.

THE PRODUCTION OF PHOTOGRAPHS WITHOUT THE AID OF LIGHT.

IN quoting our observations on M. Nièpce's discovery of a New Action of Light, the Abbé Moigno adds that it is evident we have wrongly interpreted our experiment, and have erroneously concluded that in M. Nièpce's tubes it is not the light which acts. We must remark, that we carefully abstained from saying that it was not the light which produced the effect in that gentleman's experiment. We confined ourselves to stating the result we had ourselves obtained, with which, as we showed clearly enough, light had nothing whatever to do. He further asks, What our experiments prove? and goes on to answer that—"*heat* in the tube produced the same effects that M. Niècpe attributed to light. Nothing more or less. Now, this is only what one might—nay, what one could not help foreseeing, after the communications made to the Editor of the 'PHOTOGRAPHIC NEWS' by Professor Wheatstone." We need scarcely say, that we claimed no credit for such a simple experiment as the one we made; but we may observe that we did not prepare the paper in the manner in which M. Nièpce prepared it for his experiments in reproducing pictures by means of radiant heat; also, that had such a minute description of the mode of preparing the tube previous to placing it over the negative been published, at the time we had the honour of receiving the communication from M. Nièpce on the subject, some twelve months ago, we should have tried the same experiment then.

We do not pretend to pronounce an authoritative opinion as to the cause which produces the action on the sensitive paper; we have merely shown that heat, with or without moisture, will produce this effect, and that if we employ the heat from boiling water, in which no tartaric acid is contained, we obtain the same effect; and we, therefore, conceive that it is more reasonable to conclude that this effect arises in M. Nièpce's case from a similar cause, than to attribute it to a property of light which, if it existed, would go far to prove that the Newtonian suggestion of the possible nature of light, recently brought forward by Mr. Grove, had some foundation in fact.

PHOTOGRAPHS IN NATURAL COLOURS.

A CORRESPONDENT writes to say that he is in possession of a method whereby the natural colour of objects can be fixed by the aid of photography.

Before publishing his discovery, however, he is anxious to know whether any other photographer has turned his attention to this subject, and if so, whether any success has been obtained. If within six weeks we do not receive a reply to this, our correspondent has promised to go through the whole process in our presence; his object in this is, to prevent the possibility at any future time of any one claiming the priority of discovery.

We have simply quoted the letter of our correspondent, but with regard to the actual result producible by the alleged discovery, we are quite as much in the dark as our readers.

Critical Notices.

Stereograms. By E. S. NORCOMBE.

THESE ruins are produced by a dry process described in p. 130, vol. i. It is a process respecting which we have lately had several questions asked, and, from an examination of these pictures, we have no hesitation in recommending it to the use of our readers. One of our contemporaries has advertised the process as being a new American one, but our correspondent has used it for several years. The stereograms possess all the requisites of good photographs by clearness, definiteness, and minuteness of detail. The picture of "Bishop Stafford's Monument," Exeter Cathedral, is a very fine specimen of interior photography.

Lessons on Colouring Photographs.

COLOURING IN OIL—*(continued).*

BEFORE proceeding further it may be desirable to explain a few technicalities descriptive of processes or modes of operating in the use of oil colours.

Glazing is the application of a thin, transparent film of colour, for the purpose of modifying the tone of another colour already applied. It is generally used to give depth and richness to shadows; or, sometimes, to modify or subdue lights, giving them warmth or coldness as may be desired. As this is a process much used in colouring photographs, it is important to the beginner to understand it. Glazing is generally effected by the application of transparent colours diluted with megilp; semi-transparent pigments may also occasionally be used, but will require to be much diluted. Much greater depth and transparency in shadows, and richness in many colours, is obtained by painting a little brighter than is desired in the first instance, and subsequently glazing to the requisite tone, than can be easily obtained by any other method. In colouring photographs it will often happen that but little is required in the shadows beyond modifying their tone or depth by glazing.

Scumbling is a somewhat similar process with an opposite purpose. It is the application of opaque colours, or colours rendered opaque by admixture with white, for the purpose of making the objects to which it is applied cooler and less defined. It is rarely required in colouring photographs, except in landscape backgrounds, where it may be used to give atmosphere and distance to objects which appear too prominent.

Impasting is the application on the lights of the picture of opaque colour in a thick, solid body. In colouring photographs its chief use will be to give brilliancy to jewellery by the mechanical relief of the impasted colour.

First-painting.—The material ready, and the photograph prepared, commence by colouring the face. For this purpose lay the palette with the following colours: white and Naples yellow; white, Naples yellow, and extract of vermilion; white, Naples yellow, and light red, for the lights and local colour. For the half-tints use white and terra verte; white, terra verte, and Indian red; white and Indian red; and light red and burnt umber. For the carnations: white, pink, madder, and vermilion. For the novice, especially, it will be well to keep the colours well thinned with megilp. Commence by glazing the shadows with a warm tint. Remember that the tone of the photograph and the complexion of the sitter will materially modify the choice and preparation of colours. In many cases, a mixture of light red and burnt umber will be suitable for the first glazing of the deepest shadows; for the next gradation of shadows use terra verte and Indian red; and for the pearly tints, white and terra verte. For the high lights, white and Naples yellow, with occasionally a little pink madder, will be required; these must be used without much thinning, so as to obtain a good body. They should be applied with as much accuracy as possible at once, as their brilliancy and freshness will be injured by much working with the pencil. Graduate gently from the high lights to the local colour, and blend this softly with the shadows, using grey tints for the purpose. The lines about the mouth, nostrils, and eyelids may be strengthened with Vandyke brown and pink madder.

In addition to the colours we have named for the first-painting, some tints for hair will require adding to the pallette. For the various tints of light and brown hair, the following will suffice: white, Naples yellow, yellow ochre, Vandyke brown, and raw umber. For dark hair: black, lake, Vandyke brown, brown madder, cobalt, and white. These tints properly mixed will suffice for hair of almost any colour.

The tints we have described having been applied to the face, the hair will next receive attention, keeping as a general rule the lights cold and the shadows warm. Avoid hardness where the hair joins the forehead and temples, using greys to blend them.

The iris of the eye may be coloured with Vandyke brown, burnt sienna, indigo, or cobalt, as the natural colour may require. The lips may be coloured with vermilion and pink madder, keeping the upper lip, which is in shadow, low in tone. The hands should now receive their local colour.

The draperies may be commenced by glazing the whole with an appropriate colour, on which the lights and shadows will be subsequently strengthened; of the most suitable colours we shall speak hereafter.

The background may be commenced, keeping it somewhat lighter than is intended: the choice of colour, of course, depending on the complexion of the sitter.

When the first-painting is completed, the picture must be put carefully away where it will be free from dust, until it is dry; the time required will vary with the temperature and nature of the vehicles used; but the second colouring should in no case be commenced until the first is thoroughly dry.

(To be continued.)

Photographic Chemistry.

ANALYSIS OF SILVER BATHS—(*continued*).

Analysis by Weight.—The method above described cannot be employed for baths containing cyanide of potassium or hyposulphite of soda; nor, indeed, for any liquids which are very poor in silver. If the bath contains either of the two first-mentioned substances, no precipitate will be thrown down; and when liquids contain very little silver, it is better to weigh the chloride and deduct the quantity of the metal. We need scarcely point out that this mode of analysis is applicable to all silver assays.

Take a quart of the weak solution, previously filtered, and add to this hydrosulphate of ammonia by slow degrees until the solution acquires a strong permanent odour; the silver will be precipitated, and when this is completed the clear supernatant liquor must be poured off gently, and the sulphite of silver which remains emptied into a porcelain capsule, and the particles which may adhere to the sides rinsed out by means of a little distilled water and added to the contents of the capsule; to this a little aqua-regia must be added, and the whole submitted to the action of a gentle heat—care being taken not to let the liquid boil. If the precipitate does not become quite white, a little more aqua-regia must be added. Then evaporate to dryness, and heat the capsule until the chloride of silver is fused. Then weigh the capsule, and the difference between its present weight and its weight previous to the operation, when empty, will give the weight of the chloride of silver it contains. A little calculation will then suffice to give the exact value of the residue. The chloride will be found to adhere very closely to the bottom of the capsule; it may be detached by pouring on it a few drops of water acidulated with sulphuric acid and touching it with a bit of zinc, or a small fragment of the latter metal may be dropped into the vessel, and the ingot will speedily free itself from its close contact with the capsule. The strictest care must be taken in weighing the substances in this and similar operations, and the scales must be adjusted with such extreme nicety as to turn under the weight of a very small fraction of a grain.

Assay of Bar Silver.—The assay of silver in bars is an extremely simple operation. Suppose it is desired to test the amount of pure silver contained in a mass of metal: a small piece is cut off and carefully weighed, and then dissolved in an excess of nitric acid, then, add to this solution salted water, or hydrochloric acid; the silver will be immediately precipitated in the form of a chloride, while the copper will remain in solution; the chloride must then be washed by one of the methods we have pointed out, and as soon as the water used in these repeated washings ceases to assume a blue tint on the addition of a few drops of ammonia, or a brown tint from the addition of a few drops of ferrocyanide of potassium, the chloride is placed in a porcelain capsule, the weight of which is rigorously ascertained beforehand, and evaporated to dryness; the remainder of the manipulations being the same as those described above.

If the washing has been performed in a filter, it must be allowed to drain until nothing further runs from it, and then dried in a pipkin by the application of a gentle heat; after which the precipitate should be emptied into a capsule and the filter burnt over it, and the ashes of the paper added to the precipitate, with a drop of aqua-regia, and then calcined. The scales will determine the weight of the chloride of silver, and an easy calculation will give the weight of pure silver.

(To be continued.)

Dictionary of Photography.

Calotype.—The name applied by Mr. Fox Talbot to the photogenic process on paper, published by him in 1839. Since the date of his patent it has been materially modified by various experimentalists, but the principle of the discovery, which consists in forming a surface of iodide of silver, rendered sensitive by an excess of nitrate of silver, and then, after impressing upon it a *latent* image developing this by a reducing agent, has remained untouched.

Camera.—The camera obscura was invented by Baptista Porta, of Padua, in the sixteenth century. This philosopher observed that, in a darkened room, illuminated only by a small opening, objects outside the room, in front of the opening, were depicted in an inverted position, on the opposite wall, in their true colours. The photographic camera, whatever be its shape, is an application of this discovery of Porta. It is a box, formed of wood, leather.

cloth, &c., and only admitting light through an orifice to which the *lens* is fitted; the side opposite to the lens is closed by the ground glass (a screen on which the objects are seen, and which is replaced by the sensitive surface when a picture is to be taken). The camera is so made that it is easy to vary the distance between the lens and ground glass so as to obtain that distance at which the image is most sharp, and which varies according to the focus of the lens and the distance of the objects to be copied. The camera and the lens should unite many conditions which it is difficult to obtain simultaneously:—Immobility when once fixed, even when of large size; lightness; and a sufficiently small bulk to allow it to be easily carried; and very simple mechanical adjustments, to admit of its being promptly erected and taken down. These conditions are especially necessary for cameras intended for travelling purposes. There are few plans in existence which satisfy all these conditions properly; and it will still be necessary for our instrument makers to continue their endeavours to diminish the weight and bulk of these instruments, without injury to their stability. For our own part, we prefer an expanding camera with an accordion body.

Camphor.—A concrete essential oil obtained from various species of *laurus*, especially *laurus camphora*. These trees grow at Japan, Borneo, and Sumatra; and it is at Japan that the greater part of the camphor of commerce is prepared. Purified camphor is met with as a solid white transparent mass, possessing a peculiar and strong odour and taste. By slow cooling of a warm saturated alcoholic solution, or by the condensation of its vapour, camphor crystallises in octohedra. It may be scratched by the nail, is rather flexible, and can only be reduced to powder after being mixed with a little alcohol. It is not altered by air and light, and is very inflammable, burning with a luminous, smoky flame. Camphor is only slightly soluble in water—1 part requiring about 1,000 of water, to which, however, it communicates its peculiar taste and smell. It dissolves easily in alcohol—10 parts of the latter being able to dissolve about 12 of camphor: it is also very soluble in ether. Camphor is a very powerful antiseptic agent, and is of great use in photography in preserving solutions of organic substances—such as gelatine, gum, albumen, &c.—against decomposition; a piece about the size of a pea will preserve several ounces of these liquids from change for many months.

Canada Balsam.—The nearly colourless liquid resin of the *pinus balsamea*. It is employed for cementing together the component glasses of an achromatic lens, and also for mounting microscopic objects under thin glass. It may be considered a natural varnish, being a solution of resin in a volatile oil. It has a pleasant odour, and varies very much in consistency according to the amount of either of the constituents; if too thick for use, it may be thinned with a little spirits of turpentine.

(*To be continued.*)

A Catechism of Photography.

PRINTING POSITIVES.

Q. Are not the processes of photography which have been here detailed, all, or nearly all, negative?

A. They are; but from such negatives any number of positive impressions may be readily obtained. The negative photograph bears the same relation to the positive as the engraved plate does to the impression taken from it.

Q. Is the process of obtaining positives from negatives difficult?

A. It is not; nothing can be simpler than the methods which are generally employed; the only difficulty is, allowing sufficient time for the printing of the positive, and in the careful washing to which each proof must be afterwards subjected. Practice only can make an operator skilful in this branch of photography.

Q. What is the usual mode of obtaining positive impressions from negative photographs?

A. There are two methods of photographic printing: that which is generally employed consists in allowing the chemical action of light on salts of silver to produce the picture. This process gives the happiest tones and the richest effects, but it requires a strong light, and being more dependent on the direct action of the sun's rays, cannot, with equal certainty, be always employed. The other consists in exposing the negative on the prepared positive paper for a few seconds only to the action of light, and subsequently developing the image by the application of nitrate of silver and gallic acid. The modifications of this plan are very numerous, and by it very excellent results have been obtained.

PRINTING POSITIVE PROOFS BY THE ACTION OF LIGHT.—PAPER.

Q. What sort of paper is the best adapted for taking positive proofs?

A. A good even-textured paper, transparent and free from spots, is essential, as quite as much depends on the quality of the positive as the negative paper. Many photographers prefer the Saxony paper to any other; it takes good impressions either plain or albumenised. But the great thing for every photographer is to pick out that paper in which black specks or blemishes of any sort do not appear, as it often happens that paper with the best reputation is anything but free from defects.

THE CHLORIDE BATH.

Q. What is the first step in the preparation of the positive paper?

A. Floating it on the chloride bath; this is done by taking the paper, cut to the requisite size, by two corners, and laying it gently on the surface of the bath.

Q. What soluble chloride is employed for this purpose?

A. Various chlorides are used; chloride of sodium (common salt), of ammonium, of potassium, of barium, of strontium, &c. The species of chloride is unimportant, the result being the same in all cases. Chloride of sodium is very commonly used; chloride of ammonium is preferred by some operators, and is certainly of more uniform strength and purity than common salt.

Q. In what proportion is the chloride bath prepared?

A. In the proportion of four parts of chloride of ammonium to 100 parts of filtered water.

Q. Is not a small quantity of gelatine occasionally added?

A. It is; for instance, in twenty ounces of water we may put twenty grains of gelatine. When this is done a portion of the water must be heated sufficiently to dissolve the gelatine. The solution must be afterwards filtered through paper.

Q. What length of time should the paper be allowed to remain in the chloride bath?

A. About five minutes; they must then be carefully removed, so as to have no air-bubbles, and suspended by one corner to dry; mark the prepared side, so that it may at once be known; and the paper may be kept any length of time.

ALBUMENISED PAPER.

Q. Is not albumenised paper recommended as an excellent surface for the taking of positive photographs?

A. It is; the process of albumenising the paper is exceedingly simple. The bath should be prepared in the following proportions:—

Albumen	8 ounces.
Water	4 ounces.
Gelatine	12 grains.
Chloride of ammonium	120 grains.

The albumen must be beaten up into a stiff froth; it must afterwards be decanted, and be allowed to clear itself by subsidence.

Q. How is the albumen to be applied?

A. A portion of it should be poured into a flat dish, and the paper floated for about a minute on the top, it should then be drained and pinned up to dry.

Q. How long a time will albumenised paper keep good?

A. Any length of time in a dry place.

SENSITISING THE PAPER.

Q. How is paper prepared in the chloride bath rendered sensitive to light?

A. By floating the paper so prepared in a bath of nitrate of silver.

Q. In what proportions should the nitrate bath be prepared?

A. In the proportion of 15 parts of crystallised nitrate of silver to 100 parts of distilled water. If the solution is not perfectly clear, it should be filtered.

Q. How is the paper to be sensitised in the bath?

A. By being laid on the surface of the solution so as to bring the side already prepared with the chloride in immediate contact with the liquid. Three or four minutes is the usual time necessary for sensitising the paper, after which it must be carefully removed and hung up to dry.

(*To be continued.*)

Correspondence.

PHOTOGRAPHS AND THE "BOOK POST."

To the Editor of "The Photographic News."

Sir,—We beg to call your attention to a fact in connection with the transmission of photographs by post. As the question is one of importance to publishing houses similar to our own, we hope that you will use your influence in procuring for photographers, and photographic publishers, equal rights with those of book publishers.

We have been in the habit now for some time, indeed ever since the introduction of that great public boon, the "book post," of sending photographs to our customers by that means, not only in England but on the Continent. We were well aware that if the ends of the parcel were closed that it would be charged for by *letter postage*, and that if the parcels were not prepaid they would be returned to the sender. Very recently we sent into Switzerland two photographs, the value of which was about ten shillings. The parcel was done up in the usual manner on a roller, and within the regulation size, and then posted. By an oversight, however, our clerk made a mistake in the postal charges, and put too few stamps on. The consequence was that, when the party to whom it was addressed received it, there was a charge of nearly *two pounds* sterling on it; the authorities at the post-office having charged for it by *letter postage*. The party paid this excessive charge, and immediately wrote us. We made every inquiry and then addressed a letter to Mr. Rowland Hill, the secretary of the post-office, inclosing the wrapper (which had been returned to us) of the parcel, and asking for an inquiry and explanation. In the course of a few days we received an official communication stating that every inquiry had been made, and that *one* of the reasons for charging so excessively was because the full postage was not paid; the *other* was that "*photographs were not books*," and as a consequence could not be sent under the "book-post regulation." Having stated in as few words as possible our case—one which will no doubt astonish many publishers—we ask you to use your powerful influence in having this matter set right.

We inclose you the official communication in which the post-office authorities made the above startling announcement, and remain, your obedient servants,

A London Firm.

To the Editor of "The Photographic News."

Sir,—A friend has just pointed out to me that in the report of my "Remarks on the Dry Collodion Process," in the "Photographic News," for February 25, an omission has been made which renders one sentence unintelligible. The sentence in question runs thus—"The bath I find work the best is made thus: dissolve 1 ounce of nitrate of silver in 3 ounces of distilled water, and 1 grain of bromide of ammonium previously dissolved in a little water, making up the whole to 9 ounces, by the addition of water and ½ ounce of spirit of wine, and finally adding the remaining ounces of solution of nitrate of silver."

It should be—"Dissolve 1 ounce of nitrate of silver in 3 ounces of distilled water; to 2 ounces of this add 3 grains of iodide and 1 of bromide of ammonium, previously dissolved in a little water; make up the whole to 9 ounces by the addition of water and ½ ounce of spirit of wine, filter, and finally add the remaining ounce of solution of nitrate of silver."

By inserting the above you will much oblige, yours truly,

Chas. Heisch.

Middlesex Hospital.

VIEWS FOR PHOTOGRAPHERS.

To the Editor of "The Photographic News."

Sir,—The days are lengthening, and the period of the year suitable for out-door photographic pursuits is close at hand, and amateurs will be making preparations to avail themselves of their occasional leisure Saturdays for the purpose of taking views; I therefore respectfully trespass on your space by asking some of your numerous correspondents to favour us with a few additions to the list we are already possessed of in No. 4 of the "Photographic News."

It is desirable that they should state the easiest, shortest, and cheapest mode of getting to the localities they may name. I would also suggest that they distinguish those places which are freely open to the photographer from those which can only be visited by special permission of the proprietor. This last is a point of some importance, as I know by experience, having last year gone as far as Warwick, principally to take views of the castle and grounds, but when I got there I found that although the noble proprietor freely admitted the public to *see* the building, &c., he would not permit any unknown photographer to take views; and not having a "*special permit*," I had to "chew the cud" of disappointment, which, however, I should not like to repeat.—I am, sir, your subscriber, Alex. Nicholson.

Highbury New Park.

DRY PROCESSES.

To the Editor of the "Photographic News."

Sir,—Now that the summer campaign is about to commence, you would confer a great favour on all photographers by telling us, in your next number, which of the various dry or preserved processes you think the best.

We have Taupenot's, Fothergill's, Long's, Hill Norris's, &c. &c. &c., and in the first volume of the "News" you give others, with full details; but I am sure you would not advise a novice to try each and all of these, and then to judge for himself.

The examination would be both tedious and expensive, and the best part of the season would be over before a man could decide.

We want you then to tell us, from your practical experience, which process you would advise us to follow, or to point out one or two processes presenting a fair prospect of success.

I have, myself, tried many of these dry processes, but all were failures, or so nearly so, that I abandoned them in despair; still every writer vaunts some new process, and surely *all* cannot be false witnesses; there must be some basis for their testimony, even though the results may be exaggerated.

For myself, I should only require some process by which I may prepare a few plates at night, expose next day, and develop, fix, &c. &c., on returning home same evening. I don't want the plates to keep longer than—say 24 or 30 hours; and if, in your next number, you will say which I should try, with full details, and, particularly, the average length of exposure, I should feel you had done me a great service.—Yours, dear sir, very truly, M. M. D.

[We have seen excellent pictures taken by all the dry processes, and, in the hands of experienced manipulators, it would be very difficult to decide which gave the best results. With a beginner, however, the case is different, and, in deciding upon one of the dry processes the choice should rather fall upon that which gave the most promise of good *average* results, than upon one which, while it might be capable of something superior in experienced hands, would be likely to act with little uniformity in the hands of a beginner. Judging from our own experience, which we put forth with the more confidence as it seems to be generally corroborated by that of others, we are inclined to give the preference to the collodio-albumen (Taupenot's) process. We admit that there are many difficulties to be overcome before the amateur is likely to meet with uniform success, but these are not greater than have to be encountered in the commencement of any new study, and, when conquered, the learner will be in possession of, in our opinion, the least fickle of all the dry processes. In our pages will be found several accounts of this process, each alike in the main, but differing in detail; we will not pretend to decide between the respective merits of these, as they are unimportant in the hands of a beginner, and are for the most part only trifling modifications which may be usefully adopted as experience in working the process is gained.—Ed.]

PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

The next place at which I stopped, after leaving Ghent, was Termonde; better known to English readers, perhaps, as Dendermonde; so called from its situation being at the mouth of the river Dender, where that river enters the Scheldt. Here it was that the well-remembered, kind-hearted, Uncle Toby was engaged in the wet trenches when the town was besieged by the English, under Marlborough, in 1706; which trenches, but for a fortunate drought which prevailed for some weeks, would have been a very great deal wetter than they were: for the whole surrounding country could, at that time, be laid under water by opening the sluices; and they tell you that the same thing can be done at present; but the probable consequences of such an act would, it seems to me, be a good deal more injurious to the inhabitants than if they were to suffer a hostile army to take possession of the place.

This town is very old indeed, but it is of no great size, and offers comparatively few objects worth illustrating. I was induced to visit it from recollections of Uncle Toby, but I found that having arrived there from Ghent—from which it is only about twenty miles distant—rather early in the morning, I was able to see everything about the place, get several negatives, and leave the following afternoon. The first place I visited in the town was the church of Notre Dame; which is said, I don't know how truly, to be the oldest building in the place. It has an octagon tower, and is only worth taking on account of the associations I have referred to; for it possesses very little architectural beauty. It contains two or three pictures by Vandyke, and some others by painters of less celebrity. They still show you the house where Teniers lived; but it would give nothing of a picture, and I did not feel sufficiently interested in the painter of dirty, boozing Dutch boors, to take a photograph of his residence out of regard for his memory. I found two or three views of the fortifications worth reproducing, as well as of the town itself, including a portion of the river; but the photographer need not be long in deciding what pictures he will take, as the points of view are not far apart.

Malines offers a good many more objects of interest than Termonde. It is a much larger place too, its population being, at least, three times as great. This is the place where the celebrated Mechlin lace is manufactured, a fact of which any photographer who may happen to take a wife with him is quite certain when there to be reminded. The town is a very picturesque one, and presents a great many views which are well worth preserving; apart from the particular buildings of which one takes a picture almost as a matter of course.

In what is termed the Grande Place there are several old buildings, two or three of which are worth taking separately; and the four sides of the Place yield as many very good pictures. The cathedral, which, as is the case in most Flemish cities, is the most interesting object in the place, abuts on one side of this Place. It is dedicated to *St. Rumbold*, and is something more than four hundred years old. The tower has never been finished, but, nevertheless, its height is very great, being but a few feet lower than the top of the cross on St. Paul's Cathedral, though it is very far from the height to which it was intended to raise it, viz., 640 feet. While it must be admitted that the money spent in building this cathedral was well spent; yet the manner of obtaining it cannot be considered otherwise than immoral, it having been derived from the sale of indulgences.

The interior is large; and, like most Flemish churches that I have visited, is sufficiently well lighted to enable a photograph to be taken without difficulty. The pulpit, which is very well carved, and represents the conversion of St. Paul, forms a very good subject for a picture, together with the high altar. There are numerous chapels round the building, but none of them possess any object which renders it worth while taking a photograph, but, at the same time, they contain numerous paintings which are both interesting and curious, depicting events in the life of St. Rumbold. This church also contains a painting by Vandyke, the subject of which is "The Crucifixion," and which is considered to be one of the best that artist ever painted. Another church, that of Notre Dame, is a much smaller building. It owed its origin to a statue of the Virgin which ran aground on the spot where it stands; which image was said to have floated *up* the stream; and was, subsequently, engaged in the performance of cures of all sorts of complaints. Its end was a violent one, for the army of the confederates, under Oliver Temple, smashed it when they captured the city. This church of Notre Dame must not be confounded with that of the same name containing the beautiful picture, by Rubens, of the Miraculous Draught of Fishes. For this painting, with seven smaller pictures which surrounded it, three of which are said to have been carried off by the French, Rubens received 1,000 florins, and was only ten days in painting them. It is rather curious, but it would seem that the authorities who paid him estimated the value of his paintings by the time it occupied him to paint them; for we find that for the painting by the same artist of The Adoration of the Magi, which was formerly surrounded by seven other rather insignificant paintings, he was paid 1,800 florins, the work having occupied him eighteen days; that is, as in the former case, at the rate of one hundred florins a day. Part of the château inhabited by this celebrated artist, a painting of which, by himself, hangs in the National Gallery, is still standing, and is easily got at from Malines. I intended to take a photograph of it, and drove from Malines with that intention; but just before I got there, the rain came down in a thick drizzling form, which forced me to give it up; and I drove on to Vilvorde, which is a much better place than Malines.

Vilvorde is a miserably dull place, and I fancy very few Englishmen visit it except those who are interested in the internal arrangements of prisons, and who come here to inspect the Penitentiary, an enormous prison, which has furnished models for others in different parts of the world. Close by this prison, Tindal, the first who translated the Bible into English, was strangled and then burnt. The church has some beautiful carvings in wood, which are very well worth copying when one has plenty of time, but otherwise one would hardly feel disposed to unpack for the mere sake of obtaining these. Viator.

Miscellaneous.

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Photography as an Advertising Medium.—It is not an unusual thing to meet, in the course of one's perambulations, with photography as an advertising medium. It seems to be an especial resort now of showmen and theatrical characters. The great authority on the subject of advertising—Mr. Phineas T. Barnum, with his usual astuteness, has called it into requisition as a means of attracting public attention to his exhibitions. For instance, he is at present exhibiting the renowned Tom Thumb, who created such a *furor* some years ago. When this diminutive specimen of humanity was first exhibited he had to be content with lithographic and wood-engraved portraits, showing how little he was when compared to a life-guardsman. But, now that he has again appeared on the public stage, he has his portrait taken from life, alongside of a real life-guardsman. We have made inquiries as to the result of these photographic advertisements, and we are informed that they much surpass the old method of advertising by lithographs, which, however well executed, left only the impression on the public mind of an ideal; whereas, by having photographs taken, they see the real, knowing full well that in a photograph there is no room for any of those little tricks which the lithographer can so easily put into a lithograph. Mr. Barnum, however, is not the only showman who avails himself of the resources of photography. As we passed St. Martin's Hall, in Long Acre, the other day, our attention was attracted by another photographic advertisement, that of an actor who has some distant resemblance to portraits of Shakespeare, and who, therefore, has taken to the peculiar dress in which Shakespeare was supposed to attire himself, that is, if sculptors render the clothing of the bard correctly when they chisel out a statue. We could not help laughing at the idea, as we inspected the precious picture of a man with a faint resemblance to, and trying very hard to look like, Shakespeare. The model which he evidently had been studying, was one of those extremely cheap plaster casts, painted black, and slightly bronzed. The picture altogether was what may be termed richly ludicrous. The advantage which we saw in this photographic advertisement was, that it dispelled all those poetic and sentimental ideas which a lithographer would have been certain to have introduced. Mr. and Mrs. Howard Paul, in their entertainment entitled "Patch Work," have also several photographic advertisements, which generally seem to attract attention; while Mr. W. S. Woodin has had his entertainment put into the stereoscope. Lastly, though not least, we see that Mr. Spurgeon allows himself and his lady to be exhibited in the stereoscope; but whether it is with a similar object to those above alluded to, we are not in a position to say.

Wood Engraving.—In a recent article on the application of photography to engravings on wood, we referred to the *Illustrated London News*, as an example of the importance of any improved method of transferring designs to the wood block. We selected the newspaper in question as an example on account of its being unrivalled in the beauty of its designs and its enormous circulation, which rendered it probable that most of our readers had seen it. To give a more correct idea of the extent to which this paper employs the art of wood engraving, we may state that a reference to the list published shows that in the two volumes of last year there were no less than 1323 engravings, beside 22 large pictures printed in colours. If we assume that each of these engravings covered on the average a superficial area of sixty-four square inches, that will give no less than 84,672 square inches, or 588 square feet of engraved wood block.

Photographic Notes and Queries.

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THE STEREOSCOPE.

Sir,—As you had an article on stereoscopes in a late number of your paper, perhaps the following may not be uninteresting to some of your numerous readers.

Take an ordinary stereogram in the hand, by the bottom, at the division between the two pictures. Fix the eyes upon a distant object: the axes of the eyes are then virtually parallel. Interpose the slide before the eyes at a distance of ten inches, more or less (that being the recognised average distance of distinct vision, but it must vary for different eyes). Great care must be taken not to allow the position of the eyes to change. Three pictures will now be seen, the centre one of which is stereoscopic.

A difficulty arises from the distance between the pupils of the eyes not being equal to the distance between two corresponding points of the two pictures. This may be overcome by holding the slide obliquely, so that the pictures are virtually the right distance apart; and the fact of one picture being nearer than the other is of no consequence. When the centre picture appears, turn the slide slowly till its plane is parallel to the eyes. The centre picture will then appear perfect.

The pupils of my eyes are only 2⅜ inches apart, and the average distance between two corresponding points of the pictures of a slide is 3 inches. I found it difficult at first to prevent the axes of the eyes from converging to a point in the plane of the slide, and to keep them diverging, so that each eye should look at the picture opposite to it. No doubt a person whose eyes are wide apart would not experience this difficulty.

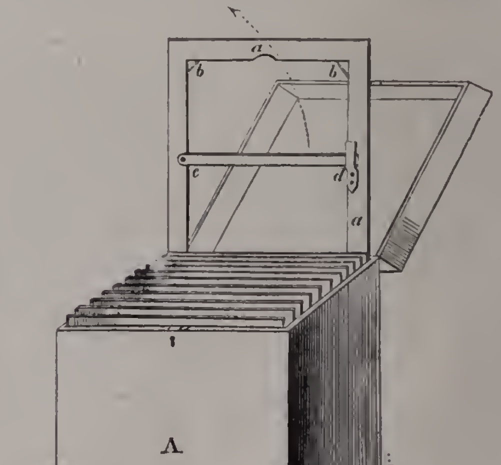
If this proves nothing else, it is a very satisfactory confirmation of the fact that the distinct images formed upon the two retinas (even without the assistance of lenses, as in the stereoscope) produce only one perfect image upon the mind.

X. P. R.

IMPROVED PLATE BOX.

Sir,—I herewith inclose a diagram and description of an improvement in the form of plate-box in general use. It is the result of numerous endeavours to obviate the abrasion of the collodion film, produced by the sliding action, necessary for the introduction or removal of a plate under the old system.

A really good negative is not so easily obtainable as some theorists would suppose, and its preservation, when produced, is of the highest importance. That the usual construction of glass-box is inadequate for this purpose, has been universally admitted, and for my own part, I remember carrying some negatives, during the winter, a distance of nearly a mile, at the expense of benumbed fingers and frozen films, rather than trust the same to the "tender mercies" of the plate-box.



Of course, varnish is a great protection: but it is often impossible, and always inconvenient, to varnish upon the spot; even were the use of those apologies for varnish—applicable without heat—a matter of no consideration. By the use, however, of the simple modification of box I now describe, plates may be placed in the cells immediately after the last washing, thus securing them from risk of dust, breakage, &c., and, although subjected to tolerably rough carriage, will remain uninjured.

A plate-box A, of the ordinary description, is procured or constructed. It should be an inch or so larger in height and width than the largest plate wished for manipulation, and with a small increase of breadth in the grooves. A slight but strong carrier *a*, of some suitable material—papier-maché would answer admirably, but wood will do—is then made to fit easily into the first pair of grooves—a similar one for the second pair, and so on until the number be completed. At the inner corners of each carrier, short pieces of silvered wire are inserted diagonally *b b*, against which the face of the plate rests. Upon the opposite sides to these, a thin strip of a flexible substance (steel, zinc, or tin, for instance) is secured at one end by a small screw *c*, upon which it moves as a centre. The middle portion of this piece should be bent inwards, that when pressed within the detent *d*, a gentle pressure may be exerted upon the back of the glass. Should the operator wish to employ smaller plates than usual, carriers nesting within the principal ones would supply this desideratum.

In the practice of the dry collodion, a dark box constructed upon this plan would probably be advantageous, as, by an adaptation of the dark slide to the set of frames, an injury to the sensitive surface would be difficult, no isolation of the plate being requisite. Euphos.

Sheepscombe.

WATERPROOFING CALICO, &c.

Sir,—I beg leave to submit the following receipt to "One in the North," and other correspondents, for waterproofing calico, canvas, &c., for portable tents, &c. I speak from experience, viz.:—

Castile soap	½ ounce.
Distilled water	1 gallon.

Boil 30 minutes; skim. When cold, place in it the calico or canvas to be waterproofed for the space of 24 hours, then hang up to drip on a line. When half dry, again soak for 3½ hours in the following solution:—

Alum	8 ounces.
Sugar of lead	4 ,,
Distilled water	4 gallons.

Again hang up to dry on a line; don't wring it.

This process entirely destroys the capillary attraction in the fibres and threads of the calico or canvas, and the rain or wet runs off the surface (if strained tight) without lodging or penetrating through the material. The solution has no effect in changing the colour or texture of the material immersed.

Sugar of lead being a powerful poison, great caution is required. This is particularly applicable to the cheap tent invented by Mr. H. Doubleday, vol. i. p. 295.

H. Bellini.

[We shall be glad to hear further particulars about the new varnishes, as well as the other points touched upon in our correspondent's interesting letter.—Ed.]

SIMPLE STILL FOR PREPARING DISTILLED WATER.

Sir,—There are some who may not think it worth their while to distil water for themselves, when it can be procured in most towns as low as sixpence per gallon. There are, on the other hand, many who know that much of the distilled water of the shops is but the condensed steam of some engine, contaminated by the lubricating grease, or by the furred and foul pipes through which it runs. These will not grudge time, trouble, and expense in getting a home-made supply of "the genuine article." Among these latter there will be not a few glad to avail themselves of a simple, economical, and yet effectual mode of obtaining the object of their desire. To such I address myself. Go to the nearest tinman and buy for 10d. a common oil can, capable of containing—say two quarts; get also some 4, 5, or 6 feet of ¼ inch "tinned" pipe, together with a piece 3 or 4 inches in length, and of a size so much smaller, that it may readily pass into the longer tube. Insert the shorter tube into and through the cork or bung that fits the mouth of the vessel; fill the can three-parts full with water, and with a packing of tow or rag fasten the bung into its place, and put your "boiler" on the fire. Now, let us prepare the "condensing apparatus:" a pailful of cold water, and an empty seltzer water bottle, tied by its handle to the inside of the pail. Bring them to the hearth. The steam rises through the little tube; fit one end of the longer tube over *it*, and the other into the neck of the seltzer water bottle, and the work of distillation goes on without requiring any superintendence, and one is enabled, in the course of a short evening, to obtain as much distilled water as is requisite for a long period of active work.

The can, if made on purpose, might answer better with less height and greater evaporating surface. The longer tube is flexible, and after its junction with the chimney is allowed to rise a bit before it is bent down to the pail. I tie the bottle to steady it; the long pipe *may* need some support from a chair-back or otherwise. Time will be gained by keeping up the supply in the "boiler" by the heated water from the condenser, which will, in its turn, be advantageously changed for cold. D.

CARRYING PYROGALLIC ACID IN PAPER.

Sir,—I wish to take a journey with camera, &c., and I am at a loss to know whether or not I should carry my pyrogallic acid put up in little paper packets to mix with water for development. I have often noticed when buying it that the paper is very greasy: now, I wish to know if the acid loses any of its strength (by greasing the paper) or is it perfectly fit for use? By giving me an answer, through your valuable journal, you would greatly oblige an amateur.

R. Harrington.

[Pyrogallic acid communicates a dark opaque stain to paper which has been in contact with it for any length of time, but we have not found that it thereby loses any of its properties. We always keep pyrogallic acid done up in little paper packets of 3 grains each, thus saving the trouble of weighing it out each time a fresh quantity of developing solution is wanted, and we have never noticed any inconvenience attending this plan.—Ed.]

PORTABLE STAND FOR A DEVELOPING BOX.

Sir,—Again trespassing on your valuable space, I wish to know if you or any of your correspondents can suggest a firm stand on which to place a developing box when in the open air. I have been using a small box, and then placed it on my camera stand, which, although firm enough with a small body like a camera on it, vibrates with the box. I have now been making a larger developing box, and require "a *strong portable* stand" on which to place it, something that can if possible be packed inside the box. If you or any of your subscribers can suggest something of this sort, I think they will have conferred on out-door photographers a great boon. P. F. P.

PENETRATING VARNISH.

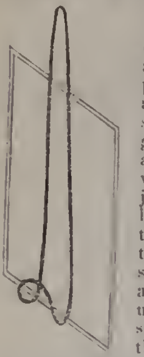
Sir,—In reply to a recent correspondent, I can inform him that I have found the following best for a penetrating varnish for alabastrine portraits:—

Mastic varnish prepared for artists ...	1½ ounce.
Spirits of turpentine	¾ ,,

The glass to be warmed before applying the varnish, and the picture afterwards to be kept in a warm room; the varnish will then set in a few hours. Thos. Gulliver.

ANSWERS TO MINOR QUERIES.

Improved Dipper.—*C. D.* asks if any improvement has been made on the usual-shaped glass dipper, as in his hands this instrument has knocked the bottom out of an expensive glass bath. Lake Price, in his *Photography*, has described a very excellent contrivance, by which all similar accidents may be avoided. Take a piece of pure silver wire, about three times as long as the bath is high, and bend it into the shape as shown in the cut. The wire should be riveted together at the upper end. The advantages of this are numerous: it is not liable to break, either when in use or in packing or unpacking for a journey. The metal falling on the bottom of the bath is not so liable to do any injury, and if the two supporting points at the bottom are made tolerably wide, there is no danger of the plate slipping off, neither will it adhere so obstinately as is frequently the case when a glass dipper is used. It must of course be kept very clean, and should on no account be made of alloyed silver, but the perfectly pure metal.



Gallic Acid in the Nitrate Bath.—*X.* Gallic acid has been recommended in small quantities as an addition to the nitrate bath for collodion negatives by Mr. Berry, and, subsequently, by M. Gaudin. A few grains to an 8 or 10 ounce bath, with the addition of a drachm of glacial acetic acid, are said to produce an extraordinary rapidity; the image being frequently visible as soon as the plate is taken out of the camera, and the development continuing without further application of a reducing agent. We have, however, never tried it ourselves, and should advise our readers not to commence with too large a quantity of "bath," as the chances are much in favour of the whole being irretrievably spoilt.

Solid Developing Mixture.—*Friday.* A correspondent informs us that he has for some time past been in the habit of using a mixture of 4 ounces of dry (white) protosulphate of iron and 1 ounce of bisulphate of potassa for developing collodion pictures. A drachm dissolved in 1 ounce of water makes a very excellent developing solution. Our correspondent states that he keeps it ready mixed in ¼-ounce packets; and when required for use he has merely to empty a paper into his (2 ounce) bottle, and fill it up with water. The advantages of having a portable mixture for this purpose, which may be kept ready for use in weighed packets, are very great, as anything which tends to substitute a dry solid such as bisulphate of potassa for a liquid acid cannot fail to prove a boon to itinerant photographers. We are not of opinion that our correspondent's mixture is the most suitable for negatives, however it might be for positives: probably, for the former purpose, a mixture of pyrogallic acid and a solid organic acid would be preferable: citric acid, in our hands, has not fulfilled all that we once anticipated from it; but probably a few experiments would soon be rewarded by the discovery of an acid equal, if not superior to, acetic acid. MM. Davanne and Girard speak very favourably of succinic and tartaric acids. These can easily be obtained, and would be well worth a trial.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Correspondents will find it advantageous to write their signatures in a legible manner, otherwise they may have difficulty in identifying the answers to their queries.

Paul Pritchard and Others.—1. Cases for binding the first volume of the "Photographic News" may be obtained on application to the publishers, through the ordinary channels, price 1s. 6d., or by post 1s. 8d. 2 A landscape lens of 15 inch focus. 3. Send a stamped and addressed envelope.

P. J. (Glasgow).—1. Where glacial acetic acid is recommended, of course it is not necessary to add common acetic acid as well. 2. Either will do, it is only a matter of taste. 3. Negative developing solution should only be made in small quantities, as it deteriorates on keeping: positive solution prepared with iron will keep much longer. 5. The plan you suggest has frequently been recommended; see previous numbers.

J. A.—Received with thanks.

A. Henderson.—The publishers will attend to the first part of your letter. 1. We do not like the process you name: the gelatine was precipitated. 2 Answered in "Minor Queries." 3. It is a common fault, and we do not know a certain remedy. 4. We hope soon to receive a communication from a correspondent on the subject of developed positives.

W. H. W.—1. We cannot give the address; can you not favour us with the information required? 2. From your account your tent must be an excellent one, and we shall be pleased to receive a description of it. 3. We are much obliged for your process and will try it. 4. There is one difficulty against the mark which you say will in future be your signature; it will not admit of being printed.

A Subscriber (signature illegible).—Boil your bath with a grain or two of cadmium for a few minutes, then filter and add a few drops of glacial acetic acid.

Stereo.—1. If you send us a stamped and addressed envelope, we will forward the information required. We shall be glad to see a description of the apparatus when you have completed it. 2. Inquire at the patent office; we are not able to give you the information you require. Many similar contrivances have, however, been made before January 1858.

J. T. Stant.—Received with thanks.

G. H. W.—Your suggestion will be attended to. 1. Negatives produced from positives by an intensifying process are not so good as when produced in the ordinary way. 2. Pyrogallic developing solution ought not to become discoloured until it has done its work, and fully brought out the negative.

T. W.—A half-plate portrait lens will not do so well for taking stereograms as a quarter-plate one, as, owing to the greater length of focus, the "field" will be so very limited.

Zetetic.—We made the only suggestion that it was possible for us to do under the circumstances; as you say that no hyposulphite could have got into your bath, we can offer no further opinion on the matter. If you will send us some of the black precipitate, we shall be able to tell you what it is. Shell-lac is bleached by chlorine, but it is an operation which could not be performed by an amateur unless he had a well-appointed laboratory.

A Voice from the New World.—All that is known on the subject of photoglyphic engraving will be found in our pages. The process, like all others, requires experience to be gained in its manipulations before good pictures can be produced, and the same may be said of photolithography. Pyrogallic acid is a better developing solution for negatives than protosulphate of iron; it will keep good for a month or more, if cool and in the dark. A nitrate of silver bath, when once in order, should not change for many months, if kept in a stoppered glass bottle in a dark, cool place.

B. Mayne.—1. Add powdered perchloride of mercury to hydrochloric acid until no more is dissolved. 2. 10 grains of carbonate of soda to 1 drachm of water. 3. Already explained in our first volume. 4. We will bear your request in mind. 5. At most medical glass warehouses.

J. Cann.—Several good methods will be found in previous numbers; we cannot help you to a better one than your own, until we know what that is.

Stanley, K. W.—1. The collodion must be prepared in small quantities as wanted, as it will not keep. 2. You will have more chance of getting a quick picture by using a *large* aperture to your lens.

F. X. Y.—Received with thanks.

Geo. Chaloner.—A spectacle glass was the one intended.

A Young Pupil.—The size to which pictures can be enlarged with a quarter-plate portrait combination in a copying camera depends upon the length of the camera, as the size of the enlarged image depends entirely upon the distance the screw is from the lens. The focal length of a quarter-plate combination will, however, be found too long to make it convenient to enlarge a picture more than three or four diameters.

P. R. J.—For a good positive developing solution see Vol. i. p. 12; and for a varnish suitable for your purpose, see Vol. i p. 143.

I. C. by U.—1. Use a little more iodising solution to the collodion than is recommended (perhaps a quarter or half as much), and use a fifty grain silver bath: in this way you will be likely to get most of the desired peculiarities. We cannot say more on the subject at present unless we were to see some of the collodion. 2. The great fault of the developing solution of protosulphate of iron and acetate of soda (Vol. i. p. 240) is that it is liable to stain the plate. Try in preference the ones recommended at Vol. i. p. 288. 3. Extreme slowness is one of the faults of this much vaunted lens.

M. C. B.—We decidedly recommend that which you have called No. 1, as being superior to any.

X. P. R.—Your second valuable communication is received with thanks, and shall be inserted the first opportunity. We shall be glad to hear farther from you on these or other subjects.

F. R. E.—We shall be pleased to receive a description of your camera box. The tent seems an excellent one from the description, and would no doubt work well in practice.

T. Clark.—We shall be glad to be the means of communicating your ideas on "fading" to the photographic world, if they seem to be such as would throw any new light upon this evil. What you state is very curious.

A Kerry Man.—Many thanks for your valuable hint; it will, doubtless, prove of great use to many of our readers. 1. What is sold under the name of "iodised collodion," "negative collodion," "collodion for negatives" (or positives), is virtually the same thing, being a mixture of plain collodion (a solution of pyroxyline in alcohol and ether) and of iodising solution (a solution, in alcohol, of iodide of potassium or some one or more of the numerous analogous bodies). The proportions of each of the ingredients may vary between tolerably wide limits, without much alteration in the properties of the resulting mixture; but as some little skill and care is required to make a good article, we should advise you, as a beginner, to purchase it ready for use, the directions in the different processes for preparing iodised collodion being intended for advanced photographers. Your bottle of "iodised collodion" is ready to begin work with; and you need not trouble yourself at present as to the exact quantity of iodine in it. 2. The pyrogallic developing solution is to be of the usual strength, as recommended in Vol. i. p. 24 3. The albumenised paper you received is already prepared with a suitable mixture of albumen and chloride of sodium or of ammonium, and is ready to be floated on the silver bath. The directions you quote, mean, so many grains of chloride to the ounce of *albumen.* Almost any printing process may be used with your paper: try the one at Vol. i. p. 86, with the further explanations given in our present number.

Communications declined with thanks:—G. S.—A. B. C.—Photo.—Alexandria (signature illegible).

The information required by the following correspondents is either such as we are unable to give or it has appeared in recent numbers of the "Photographic News:"—F. G.—Positive.—G. C. L. Y. O.—Jabez.—G. C. H.—A Very Young Photographer.—Plato.—A Piano Forte Maker.—B. S. M.—Chalk (No).—Mornington.

In Type:—S. Maddison.—A Wax-paper Man.—T. Beta.—H. Bellini.—A. B.—John Rowlinson.—Cyanide.—A. Henderson.—Suggestor.—P.—W. J. W——n.—F. R. E.—Geo. Dunn.—J. J. H.

On account of the immense number of important letters we receive, we cannot promise immediate answers to queries of no general interest.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 29.—*March* 25, 1859.

PHOTOGRAPHS AND THE BOOK POST.

Our readers will remember that we last week published a letter from "*A London Firm*," complaining of a charge made by the Post-office. The firm in question is one of the first—if not *the* first—in London; and it was impossible for us to doubt that their complaint was well founded. But the matter being one of great public importance, we, before publishing it, forwarded a proof for examination, in order to avoid the possibility of error. This proof was returned to us with a note, without having undergone the slightest alteration, and it was published in the "Photographic News" of Friday last. It will be seen, therefore, that we took every precaution in our power to assure ourselves of the accuracy of the statements contained therein.

It is not necessary, in addressing photographers, that we should dwell on the extreme importance of the statement contained in the letter we have referred to; consequently, they will readily understand our motive for addressing the following letter to the Editor of *The Times*, and which was published in that paper on Saturday last:—

"*To the Editor of 'The Times.'*"

"Sir,—Will you allow me the privilege of making myself heard by the Post-office authorities, through the medium of *The Times*, on a subject which affects, perhaps, 500,000 individuals? My grievance is as follows:—

"Ever since the publication of the amended regulations for governing the book post, photographers and dealers have been in the habit of forwarding photographs through the post, without any objection being made; in fact the fourth regulation appears to me expressly intended to include sun prints, and most certainly was never intended to exclude them; yet Mr. Rowland Hill has thought fit within the last few days to pronounce an arbitrary dictum, to the effect that photographs do not come within the terms of the Post-office regulations. The occurrence which drew forth this expression of opinion on the part of that clever, but somewhat arbitrary official, who directs the energies of the Postmaster-General, is contained in a letter addressed to the *Photographic News* by a photographic publishing firm which *The Times* has recently assisted to make famous. It was natural that as the matter was one in which photographers are principally interested they should address their complaint to their own special organ; but I feel that though the publication of their complaint in the *Photographic News* may excite as much latent actinism in Mr. Hill's organization as would suffice, under other circumstances, to print several photographs, it will not be sufficient to induce him to change his expressed opinion; and, as the matter is one in which the public is largely interested, I venture to hope that you will allow me on the part of the general body of photographers to make our grievance known; and through the columns of *The Times* to assist in impressing on the Post-office official's mind that the Post-office was made for the public and not the public for the Post-office.

"I am, Sir, your most obedient servant,

"The Editor of the Photographic News."

"*Photographic News* Office, March 17."

In reply to this letter, Mr. Rowland Hill wrote to *The Times* denying that there was any ground for the statement contained in it, and also that there was any intention of altering the regulations which govern the book post, which we need scarcely say includes prints, &c. We should have been very glad to believe that such was the case, but, unfortunately, the letters written from the Post-office appear to be in direct contradiction with the publication which bears the title of the "British Postal Guide," and is published "by command of the Postmaster-General." We have before us at this moment a letter, dated from the General Post-office, St. Martin's-le-Grand, duly numbered 51388, and signed J. Tilly, which was written in reply to one addressed to them by the "London Firm," in which the following passage occurs:—"I can only repeat . . . . that photographs cannot be sent to France from this country under the regulations of the book post." On turning to the "Postal Guide" we find the following, included in section 81:—"As regards packets sent through France" (except to certain countries enumerated, in which Switzerland is not included), "the term 'printed papers' does *not* include cases or rollers, or maps, book-markers, pencils, pens, &c., but *does* include parliamentary proceedings, books of every kind, sheets of music and *prints*." How are we to reconcile this apparent contradiction? The official letter says one thing, the official guide another—for the denial of Mr. Rowland Hill involves the admission that photographs *are prints*. The letter says, prints may *not* be sent to certain places under certain circumstances; while the *Postal Guide* states the exact contrary. By which are we to be guided?

It is in no captious spirit that we make these remarks, for we have special reason to recognise the progressive improvements that are made in the arrangements of the Post-office, but until we obtain an explicit answer to our question, no transmission of photographs from this country through France can take place, except paid for by letter rate.

CELESTIAL PHOTOGRAPHY.

The following extract from the report of the council of the Astronomical Society to the thirty-ninth annual general meeting, which we have taken from the last number of the *Monthly Notices of the Astronomical Society*, will, we doubt not, be perused with interest by our readers, as affording an evidence of the important services our art is likely, ere long, to render to the sublimest of all the physical sciences—Astronomy:—

"Mr. De La Rue during the past year has continued his experiments in celestial photography, and has made several improvements in the process; his observatory has been devoted chiefly to the delineation of our satellite, of which a great number of very perfect negatives have been obtained. Transparent positive copies on glass, 8 inches in diameter, have been presented by him to several observatories and astronomers; and he informs the Council that Mr. Fox Talbot has kindly proposed to apply his newly-invented art of heliographic engraving to the reproduction of one of the lunar photographs: should this be successful, it is hoped that the distribution of these beautiful objects will become more general. When two of the 8-inch photographs, presenting a sufficient difference in libration, are viewed by means of the reflecting stereoscope, the elevations and depressions of the lunar surface are made remarkably conspicuous, and an opportunity of studying the physical structure of our satellite is afforded which is likely to prove of value. The stereoscope adapted for the display of these photographs was exhibited at one of the meetings of the Society. Mr. De La Rue is at present engaged with experiments in photography with a 4-inch silvered glass reflector made by Dr. Steinheil, who has undertaken to make for him a 13-inch silvered glass speculum, with which it is probable that a considerable advance will be made in consequence of the greater amount of light reflected by silver in comparison with speculum metal, and the probability that the time of exposure of the collodion film will be considerably reduced. He informs the Council that he made one attempt to obtain a photograph of Donati's comet, but that he did not obtain any trace of an image in 60 seconds: this he thinks attributable to the low altitude of the comet at the hour he made the experiment, and not to want of requisite brightness of the comet itself. A severe domestic calamity prevented a repetition of the experiment under more favourable circumstances.

"Although Mr. De La Rue was unsuccessful in producing an impression of the comet with his telescope of 10 feet focal length, Mr. Usherwood, an artist residing on Walton Common, succeeded in obtaining, in 7 seconds, a good negative with a portrait lens of short focus The camera was stationary, hence the image is somewhat imperfect, nevertheless it bears enlargement of four times tolerably well. Mr. Usherwood's residence is situated about 700 feet above the sea-level, and it is possible that his success is in some degree attributable to this circumstance, but is chiefly due to the large area of the portrait lens and the relative shortness of its focal distance. So far as the Council has been informed, this is the only instance of a photograph of Donati's comet having been obtained.

"The photoheliograph erected in the dome of the Kew Observatory under the direction of Mr. De La Rue for the Royal Society, has been at work since the beginning of last March, and excellent photographic pictures of the solar spots and faculæ are obtained. Certain alterations have been made by Mr. Welsh, the Director of the Observatory, in order to regulate the term of exposure of the collodion plate to the sun's action; with these alterations the instrument gives very good results. The time of exposure necessary to produce a wet collodion picture even when the aperture is diminished to about 1 inch, and the image enlarged by the secondary lens to 4 inches in diameter, is only a very small fraction of a second. The apparatus for regulating the duration of light-action on the collodion plate consists in a sliding plate, having a slit which can be increased or diminished in width, and situated near to the collodion plate; this is moved by means of a spring across the interior of the telescope; and the time of exposure is governed partly by the regulation of the opening in the slit, and partly by accelerating or retarding the motion of the plate across in front of the sensitive plate. The work of the Kew photoheliograph has been of late interrupted by the illness of Mr. Welsh, but it is intended to appoint an additional assistant, whose duty it will be to take photographs of the sun each day that the weather permits.

"At the suggestion of Mr. De La Rue, M. Otto Struve has proposed to the Academy of St. Petersburgh to establish a photoheliograph in Russia, and the subject has received favourable consideration by that body. Thus, it is very probable that Sir John Herschel's suggestion, that the sun's spots should be daily recorded at several stations, will soon be carried out.

"Father Secchi continues to devote his refractor to photography, and has recently succeeded in obtaining a photograph of *Saturn*. The photographs of the moon produced by him have been distributed to several observatories.

"Mr. Bond has communicated to the *Astronomische Nachrichten* a series of experiments on stellar photography, made under his direction by the photographers Messrs. Whipple and Black, at the Observatory of Harvard College, in 1857 and 1858. These experiments were made on the double-star *Mizar* and its companion, and on *α Lyræ*, with different apertures of the object-glass, from 1 inch up to the full aperture, 15 inches, and with different times of exposure. The object of these experiments was to ascertain the possibility of classifying stars according to a scale of photographic or chemical magnitudes analogous to the common optical scale, but differing essentially in the fact of its being based upon actual measurements in the place of the somewhat uncertain estimates hitherto resorted to. Mr. Bond finds that a certain definite exposure depending on the brightness of the star is required before any trace of light action can be detected on the collodion plate. At the expiration of that interval the photograph is suddenly developed by the clustering together of from ten to twenty molecules within an area of about 1 second in diameter. The number of molecules increases rapidly with the time of exposure, while the boundaries of the photograph extend on all sides. Mr. Bond remarks that the diffusion of light-action over considerable areas is obscure, and that if it were due to the dispersion caused by imperfection of the object-glass, it ought to be checked by reducing the aperture, which is not the case; he is inclined therefore to think that atmospheric disturbances may in part account for the phenomenon. Mr. Bond also finds that the images of stars increase by the addition of equal areas in equal times. Hence that, in comparing the photographic images of two stars, the time of exposure of each has to be taken into account. Mr. Bond has given several tables of comparison between the observed diameters of star-images and those computed according to formulæ he has proposed, which show a remarkable coincidence between the two values, proving the importance of the photometric process."

NEW PRINTING PROCESS.

BY WENTWORTH L. SCOTT, ESQ.

I beg to give, for the benefit of the readers of the "Photographic News," a brief account of my recent improvements in positive printing. I have no doubt but that the process will prove as successful in their hands, as it is satisfactory in my own.

My *salting solution* is thus prepared :—

In about half a pint of distilled water the following substances are dissolved—having been added in the order here placed—

Pure chloride of ammonium	200 grains
,, bichloride of mercury	20 ,,
,, acetate of lead (*neutral*)	30 ,,
,, starch (either arrowroot or potato)	10 to 60 ,,

Agitate the whole, and boil for 15 minutes: when cool add a sufficiency of distilled water to make its volume one imperial pint, and filter. If the paper is of a very fine, even texture, *immerse*, in the above solution; if a more *open* variety, float on the surface for 2 or 3 minutes.

The papers I myself prefer are those of *English* make, and also the *Papier Rivé* and *Papier Saxe;* most of the other kinds contain too large a quantity of sulphates, as may be known by analysing the ash.

The sensitising solution I employ is the ordinary one of 60 grains of nitrate of silver to the ounce, to which has been added about 2 per cent. of *nitrate of lead* and a little *alcohol.*

Expose in the pressure-frame as usual, but only *slightly* over-print; this part of the process will occupy less time than by the ordinary methods, owing to the greater sensitiveness of the paper. When the print is removed from the frame, it should be immersed in water for about a quarter of an hour; whenever practicable and convenient, the water should be used *hot*—say 30° below the boiling point. It must next be in contact with brine, or with a solution of the ordinary commercial sal-ammoniac, for a few minutes; when, after rinsing, it may be plunged into the *toning bath*, for which the formula is given below :—

Biborate of soda (borax)	120 grains.
Solution of chloride of soda *P.L. strength*	20 to 40 minims.
Terchloride of gold	7 grains.
Water	20 oz. = 1 pint.

Mix and filter. The "toning" will proceed rapidly, and the operator has a choice of several tints. The final processes are, rinsing, fixing with a solution of hyposulphite of soda (rendered very slightly alkaline by the addition of a little caustic soda), 4 or 5 ounces to the pint, and washing for 6 or 8 hours in a stream of running water.

The above "toning bath" is equally good for all kinds of paper—salted or albumenised—and prepared by any of the usual methods; but for softness and delicacy of tone, my salting solution will, I think, be found to be the "best out." Albumenised paper, too, gives finer results by being floated on the same, and dried previous to sensitising.

7, *Brunswick Terrace, Westbourne Grove, W.*

DR. MUSPRATT ON PHOTOGRAPHY.*

SECOND NOTICE.

In our last article on this able work now issuing from the press, we ended with the notice of the glass processes; in this new number, 49, we have the paper negative processes—printing, in its several branches—engraving by light—and the stereoscopic portion of the art.

The Paper Processes commence by giving the two ways of iodising paper for the Calotype Process, viz., by the single and double washes. After it is well washed, Dr. M. states that it will *keep for some weeks*, adding, that some people affirm that it will *keep for an indefinite period*. As to this question, we are, ourselves, in no doubt, as we have invariably found the old iodised paper—even when years old—better than the new. Then comes a comparison betwixt the two methods of iodising by the single and double washes. He states that the *single* is the most economical, but, at the same time, the least certain; and this must certainly be correct, if the time of immersion in the iodide of potassium solution after the wash with the silver is *critical*, owing to the danger either of leaving free silver or dissolving the iodide of silver; but if there be any danger of the solution of the iodide of silver, what is more simple than to saturate the iodide bath by allowing a drop or two of silver to fall into it? We mention this on account of some late experiments with very large sheets of paper, and the washing of these when iodised by the single wash was very troublesome, as each sheet had to be immersed in a large vessel of water alone, owing to the pressure of one upon another when washed together; and when iodised by the single wash, the washing by having three or four vessels of water, and passing them on, when iodised, from one to another until they all meet in the last, and then a final soaking of an hour to complete them, saves an immense quantity of water and time, and, we believe, answers equally well. In small sheets, up to 10 × 8, there is no need of this arrangement, as a quantity may be washed at the same time. The excitement of the paper is next discussed, and here an old calotypist cannot fail to be struck by the very small quantity of acetic acid used in the silver solution, which is about a quarter of that recommended by most operators. This, in another place, he explains by telling us, that the want of half-tone, too great an intensity of the blacks, and want of detail in the shadows—which are a frequent defect of paper negatives—may be thus remedied. These faults, or most of them, we believe, are less frequently met with in paper than in glass, and, in calotype, seldom trouble us, as the common drawback to this process is, getting a paper which will give us blacks dense enough. As to using so small a quantity of acetic acid, our experience is also contradictory—we have often found that even the usual formulæ contain too small a quantity, and, by increasing the proportion of this acid, we have obtained beautiful clean pictures with no want of half-tone, when, otherwise, dirty spotted *daubs* were all we could get: but, it must be remembered, that when we used much more acid, we always made the gallo-nitrate half as strong again, using 15 drops where we used 10.

The Waxed Paper and other Dry Processes he terms "Calotype process No. 2," under which he includes all papers iodised by immersion in the iodides and so kept for use, until rendered sensitive by applying the silver. In the iodising he recommends no salt but the iodide of potassium, in this agreeing with our own instructions published in 1853, and afterwards states that most, if not all, of the other substances employed—rice-water, gelatine, honey, bromides, cyanides, fluorides, &c. &c.—are absolutely inert; this agrees with what Mr. Townshend long ago declared as his experience, or is even more simple, as he used bromide also.

His summing up of these processes has also a fact or two to be noticed. He condemns the use of salts of cadmium instead of potassium, as introduced into the nitrate bath it has an acid reaction, which renders the paper less sensitive, prevents the details from coming out, and makes the blacks less dense. Then he states that calotype negatives are not evenly waxed by the common mode of proceeding, as they cannot thoroughly imbibe the wax without the size is altogether removed, which may be done by immersing the finished negative in equal parts hydrochloric (muriatic) acid and water, and then it will present a beautifully even appearance. The hydrochloric acid, *so diluted*, does not injure the picture in the least.

Lastly, he says, the paper processes are very insensitive when compared with wet collodion. This may proceed from the great quantity of acid used—certainly they are not as sensitive as collodion, but very few operators deem the calotype so quick as it really is. If iodised paper is excited by applying aceto-nitrate solution undiluted, exposed while wet (as collodion), and developed immediately by applying saturated solution of gallic acid, the picture comes out beautifully clean, and the time of exposure is wonderfully short. About thirteen years ago, with the lens of a small magic lantern, twenty seconds gave us a very good negative, than which we have seen few better even in these improved days; had the lens been one of the modern ones, doubtless ten seconds would have sufficed.

The Printing Processes come next, where the several methods of producing the picture are mentioned, including *transparencies*; then the Carbon printing is gone through at length, noticing Blair's improvements and ingenuity in placing the negative at the back of the prepared paper, and so gaining better results; but it is needless to go through this part, as the "News" has had enough of it of late to give everybody a full explanation of what is not changed here. The same also may be said of the Uranium and Ink processes, which last, we think with others, will one day be *the* process.

The Sun-Printing on Plain Paper is thus described:—float your paper, the best Saxe, on 4 grains of gelatine and 4 grains of salt dissolved in one ounce of water, let it remain two minutes, dry, and excite with a 50 grain solution of ammonio-nitrate, wash, after the picture is printed rather deeply, and tone by immersion in bath made thus—

Distilled water	2 ounces.
Hyposulphite of gold and soda (sel d'or)	1 grain.
Hydrochloric acid, pure	5 minims.

wash again, and immerse in solution of hyposulphite of soda, 1 part to 20 parts water, well wash as usual.

We have little fault to find with this, but still we do not like the mixture of *any* acid in the toning, and the fixing solution is *not strong enough*. It has been clearly shown that without the hyposulphite solution is much stronger, a salt is formed *insoluble in water*, and not the otherwise *very* soluble hyposulphite of silver.

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* "Chemistry, by Dr. Sheridan Muspratt, F.R.S.E., M.R.I.A." Article, Photography, No. 49.

In his Printing on Albumenised Paper he recommends 6 grains of salt to the ounce of albumen and water in equal parts, and excites by floating upon a 40 grain solution of silver. He then tones and fixes in the same bath, made by mixing 1 part of hyposulphite of soda to 6 parts of water, to every ounce of which half a grain of chloride of gold is added; here it is left until the change of colour is completed. According to many this process is not to be found fault with; but we always feel distrust of those processes which tone and fix in the same bath.

Printing by Development.* The paper is immersed in a solution of 6 grains salt and 1 *part* (we suppose *grain*) of iodide of potassium to the ounce of rain water; excite by brushing over it—

Distilled water	1 ounce.
Nitrate of silver	30 grains.
Lemon juice	6 drops.

This reminds us strongly of the *citrate of soda* process. Expose until a faint image shows itself, develop with a saturated solution of gallic acid, and fix as in the ammonio-nitrate process, as it needs no toning. This, we think, hardly gives exposure enough to develop well, as the picture must show *all the detail*, though faintly; because little, if any, invisible portions come out in the after treatment, and the picture is not so hard when exposed rather longer.

Then, to sum up, Dr. M. declares ammonio-nitrate and developed prints to be permanent, and albumenised pictures to fade frequently. Experiments, however, flatly contradict this statement; and when the latter are well washed, if an advantage has been observed on the side of any process, it is this. One of our greatest photographic chemists not long ago declared that the *developed prints had not been observed to have any advantage over those printed by direct sunlight.* Next we have an account of Moule's "Photogen," with the composition which he uses. This also has been discussed so much, that it is useless to enter again into the question as to the results.

Photo-Lithography follows, and Dr. M. gives us an account of Messrs. Cutting and Bradford's, of Boston, U.S., method, which differs very little from the generally-known one; to the bichromate solution is added sugar and gum arabic; after exposure it is washed with a solution of soap, and so, the patentees state, that an insoluble soap is produced. Dr. M., however, thinks this a very dubious explanation. It is the use of sugar and soap to which the patent refers; but this method differs little, if at all, from what has long been known and used, and the patent seems useless, to say the least of it.

Photoglyphic Engraving, patented by Talbot in 1858, is another method of getting a printing plate by photography. This has been so lately described at length in our pages, that it would but be repetition to go through it here.

Photo-Galvanography is next described at length, from the printing (as we may term it) on the gelatined plate of glass, swelling the hidden parts of the coating by immersion in water, taking the gutta percha mould, and from it the electrotype, and from *that* the plate to be used in the printing by the copper-plate printer. Altogether this process is stated to occupy three or four weeks. Thus ends this branch of photography, which is, doubtless, one day to be the most important part of this already universal and interesting art. Of these methods our own opinion is, that photo-galvanography will soon disappear, and photo-lithography and photoglyphic engraving be the most used. If our readers ask why, we reply, that the tedious electrotyping, the comparatively long time, and, above all, the reproduction of the plate from the gutta percha mould, are all objections to this process; and when we observe the *straight-forward* way in which Talbot's method comes to its result, who can doubt the end being what we say? Again, very few, if any, of the galvanographic plates have been laid before the public without considerable touching up by the engraver, and so we have scarcely had a chance of judging as to its real results. But on this subject, doubtless, there are very different opinions.

The Stereoscope is here discussed at great length, and yet Dr. M. declares *he only gives the leading facts*. The construction of the instrument is here described at length, with an explanation of its principle illustrated by a cut showing the angles of vision, &c. The different forms of stereoscope are then described with illustrations, commencing with the reflecting form, and at the end of this description, Dr. M. declares the reflecting stereoscope to be not open to any single objection, practical or theoretical. So we ourselves think; and were it not that it is a little troublesome to affix the pictures so as to perfectly coincide, we see no reason why it should not be exclusively used.

The Lenticular Stereoscope he then describes by a wood-cut, showing the best form—recommending achromatised meniscus lenses (we quote his own words), five inches focus with the hollow sides outward—in fact, the very lenses used to take the pictures—and sets them in a blackened box, through which the eye looks on to the picture placed on a sliding back.

Then we come to Stereoscopic Pictures where the angle is disputed, or rather is declared to be "evidently right when the lenses are 2½ inches apart *only*." Next we have Brewster's opinion as to the general lenses being much too large, and recommending the division of one large lens to make two of exactly equal focus. Wheatstone's rules for the distance betwixt the lenses are then given and compared with Brewster's—the former make the distance very great, even 4, 6, or more, feet for objects more than 150 feet from the operator. Next we have notices of the mounting, and rules to be observed in the taking of views—their defects and remedies—recommending the form of stereoscope which is best—ending in rather a severe criticism on those who advocate a greater distance betwixt the lenses than 2½ inches. *If it be thought desirable to represent things as one should see them if the eyes were farther apart than they are,* THEN *the distance may be exceeded!*

Thus ends Dr. M.'s article on this growing art. What are the deductions from it? Even in its present stage must not the non-photographic reader be astonished at the already numerous applications of what was ten or fifteen years ago confined to the uncertain production of paper negatives and daguerrotypes? As a Photographer's Manual we have reviewed this article, and, as the reader must perceive, have found some things in which our opinion (as manipulators) runs counter to Dr. M.'s; yet the writer of the article will surely esteem it an honour to be reviewed as though he had written it for a practical purpose, rather than think it harsh to be reviewed as *practical* when it was written for the public! He has done his task well, and will secure many readers. The interest in Photographic Chemistry is much greater than most men think—he who begins *mechanically* very often ends *chemically*; and the field for investigation is most alluring and illimitable for the working chemist as well as the natural philosopher.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

Must we therefore say that there is nothing more to attempt, nothing more to be accomplished? On looking at the magnificent results which are offered to the admiration of the public, one is tempted to believe it; but, one *chef d'œuvre* on collodion is often followed by so many inferior negatives, even in the case of professional photographers, that we think beginners will be grateful to us if we remove a few of the obstacles in their way.

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* On Printing by Development, and other methods, we hope shortly to receive an important communication from a correspondent to lay before our readers.

* Continued from vol. ii. p. 15.

We have already observed, on referring to the spontaneous decomposition of gun-cotton, that this substance when properly made and preserved remained unaltered for an indefinite period, and this we repeat. We are more than ever of that opinion. In fact, ever since we have made gun-cotton, in other words ever since it was discovered, we have never been able to detect any change in it from keeping, even when we have kept it for three or four years; which we ascribe, not only to its being perfectly washed, but to its being kept in a place where air had free access to it, and simply folded in several sheets of blotting-paper.

It appears to be a practice among English photographers to prepare their gun-cotton by means of acids kept at a high temperature. We give no opinion on this point, because we are convinced that a gun-cotton perfectly well adapted for all photographic purposes may always and easily be obtained by means of the reaction of ordinary sulphuric acid on pure nitrate of potassa. To complete our observations on the care necessary to be observed in the preparation of gun-cotton, we will observe that it is necessary to give the mixture of acid and salt a merely syrup-like consistence; it is not therefore necessary that there should be an excess of nitrate of potassa. Besides this, the immersion of the cotton should be made just previous to the advanced formation of the sulphate of potassa which very speedily thickens the mixture. But there is another and more powerful reason for immersing the cotton without the least delay, and this is, that its transformation into pyroxiline arises solely from the liberation of nascent nitric acid. Now, the production of this acid, which manifests itself with considerable violence at the first contact of the sulphuric acid with the finely powdered nitrate of potassa, very speedily slackens. It is especially efficacious during the first ten minutes, and this lapse of time is necessary for a perfect transformation of the cotton into pyroxiline. There is no necessity to regard the surrounding temperature. In winter, as in summer, the chemical combination of the two bodies constantly develops a normal heat with which one should be satisfied. It is always advantageous to operate with a small quantity of cotton at a time, say from a quarter to half an ounce, and extreme care should be taken to keep it beneath the surface of the syrupy mixture by means of a strong glass rod.

Preparation of Collodion.—So many formulæ have been published that we will not expose ourselves to the reproach of adding another to the list which is already of such formidable proportions. All these formulæ may be reduced to the association of the iodides and bromides with the normal collodion in fixed proportions. But is it really necessary to proceed always by such exact weights? We think not, for we have every reason to believe that, in a preparation of this kind, nothing more exact is required than a sound appreciation of its effects. Now the elements of this appreciation can hardly be given in figures, they exist rather in a peculiar tact and observation. Still, to avoid straying too far from the truth, especially in the beginning, we admit that figures are of a certain utility, but it will soon be found by experience that, in the subject under consideration, they have no positive meaning. Therefore the mode of proceeding we advise is as follows:—

Introduce about four parts of gun-cotton into a bottle containing 100 parts of good, but not rectified, sulphuric ether of commerce. After immersion for about an hour, the cotton-powder stirred from time to time becomes dilute, separates and falls to the bottom of the bottle, without being in reality dissolved. When this takes place a few parts of properly rectified, but not absolute, alcohol must be added to the mixture. The dissolution of the gun-cotton then becomes very visible; and it is still further stimulated by the addition of fresh alcohol, but it must be borne in mind that the total quantity of this latter substance ought not, as a rule, to exceed a fifth or a sixth of the weight of the other. It may often happen that this quantity may be exceeded with advantage; but in that case the rectification of the spirit must be carried higher. After standing for about twelve hours, the solution is decanted, which, seeing the excess of gun-cotton, we will suppose to be incomplete. It is necessary, therefore, to ascertain the consistence of the collodion obtained. It will evidently be too thick; and, to prove this, it is only necessary to pour a little of it on a clean plate and drain the excess back into the bottle in the usual way. When the film has set sufficiently, rub the film with the finger and the thickness will at once be seen. In the case we are supposing it will be found too thick, and must be attenuated by the addition of ether in preference to alcohol. We may mention, in passing, that collodion which is too thick, and which has been iodised, ought never to be attenuated except with ether: there would be danger in using alcohol. The fact ought not to be lost sight of, that a collodion rather thick at first acquires greater fluidity after keeping for a few days. Besides, in consequence of the greater or less extent of the glass and the surrounding temperature, the collodion film assumes a relatively variable thickness. It is, therefore, impossible to lay down precise instructions on this point; experience alone is the best guide. In general, a thin film is advantageous, especially for dry collodion; it adheres more strongly to the glass, and resists the different washings better. It is absolutely essential, however, that, when dry, it should be perfectly transparent. With bad ether or a too weak alcohol it will be milky; and when this is the case the preparation may as well be thrown away at once.

(*To be continued.*)

Lessons on Colouring Photographs.

COLOURING IN OIL—(*continued*).

Second Painting.—As we have before explained, much of the effect of oil painting is obtained by applying one coating of colour over another. As this cannot be done until the first colour is dry—and some hours, at least, are required for this purpose—it is customary to divide the work into three paintings. In some cases, the colouring might possibly be completed in two paintings, and in others, especially where very high finish is required, several more paintings will be desirable; but, in most cases, three will be found sufficient. It is of the utmost importance that the first colouring be completely set before the second is commenced, otherwise the colour will work up, and anything like purity or brilliancy will then be hopeless. The time required will vary according to the temperature of the painting-room, the nature of the vehicle used, &c.; but, in most cases, the colouring may be resumed each consecutive day. It will be obvious that some system must be used to get the whole of each separate painting done without smearing some part of it. To do this, it is necessary to commence at the top left-hand corner of the picture, colouring downward and to the right; by this means the work will be finished above the hand all the way.

Having ascertained that the first painting is thoroughly dry, take a soft, flat camel's-hair tool, charged with poppy oil, and pass it over the whole surface; after which, wipe away all superfluous oil with a piece of soft kid leather or silk. The effect of this "oiling out," as it is called, which is performed between each colouring, is not only to give softness to the work already done, but disposes the after painting to unite with that already applied.

Now, lay the palette with the following tints:—White and Naples yellow; white, Naples yellow, and rose madder; white, light red, and terra verte; white, Indian red, ultramarine, and raw umber; white, purple madder, and ultramarine; vermilion, raw umber, and rose madder.

It is important to have a duplicate copy of the photograph at all times under the eye, a strongly defined print being best. Carefully consulting this, proceed to glaze the shadows with a tint appropriate to the complexion. In doing this, remember that the shadows of flesh in dark or sallow persons incline to green, or a greenish grey; in fair persons, they partake more of blue; and, in very florid complexions, they incline more to purple. Strengthen the lights, and blend them with the shadows, by means of delicate greys. Glaze the reflexes with a warm, transparent tint. If these are wanting in the photograph, they may be put in with a little white and Naples yellow, and subsequently receive warmth and transparency by appropriate glazing. Soften all hard lines about the face, especially the eyebrows and junction of the hair and forehead.

Proceed to the background, which may now be advanced to about the desired colour. This, as we have before said, will much depend for its tint on the complexion of the sitter, and the colour of the draperies; the hints we have given, in our remarks on the relations of colours, being borne in mind. Take care that the background is relieved by light and shadow, and that the figure does not cut it too hardly, especially about the head. or it will appear inlaid. For plain backgrounds, the following tints, properly mixed, will give a variety of good effects:—

Black, white, and Indian red.
Black and Indian red.
Black and burnt sienna.
Black, white, and lake.
White, raw umber, Indian red, and black.
Brown ochre, white, and burnt umber.
Prussian blue, black, and white.
Raw umber, terra verte, and burnt sienna.
Brown umber, yellow ochre, and lake.

Landscape backgrounds will require a greater variety of tints, depending on the nature of the objects introduced. For a sky, the following colours will be found useful:—French blue, or ultramarine, white, vermilion, Indian red, madder lake, yellow ochre, Naples yellow, and raw umber. It is necessary to observe, that the background of the photograph, on which to paint a sky, should be of a very light tint, as nearly white as possible, otherwise it will be impossible to paint a clear, transparent aërial sky. We would caution the beginner, however, against the background obtained by cutting out and masking the figure, as the hard outline thus produced would materially increase the difficulties of even the experienced painter. The intense blue will be, at the zenith, gradually growing paler, until it mingles with the rosy and yellow tints of the horizon. Avoid too blue a sky, and be careful, in graduating the tints of blue towards the horizon, not to produce a green one by mingling blue with yellow. Clouds will vary with the character of the sky. The following tints, variously combined, will often serve:—French blue, white, Naples yellow, Indian red, madder lake, black, and brown madder.

(To be continued.)

Photographic Chemistry.

In our last number we concluded the series of elementary articles on photographic chemistry, and we have no doubt that those for whom they were written will have benefited by the information contained in them, so as to have acquired a knowledge of the reason why certain effects are produced by the reaction of certain chemicals on each other. Not only is this knowledge valuable in itself, as enabling the young photographer to judge of the best method of remedying faults in the chemical substances he employs, but it adds greatly to the interest with which he watches the results of his operations. In the absence of such knowledge, photography is little more than a mechanical art, and he who practises it under such circumstances can never feel an intelligent interest in what he is doing, but only a feeling similar to that of the gambler who hazards a stake in the hope that it may bring him a prize, but has no control over the result, and is as likely to find it a blank, or something very little better.

In this series of articles we have purposely confined ourselves to a brief notice of the various substances treated of, as we wished to give a general idea of the chemistry of photography, but we propose, in future numbers, to go more into detail, and not to confine ourselves to chemical substances, but to treat of photographic manipulations and apparatus at greater length.

Dictionary of Photography.

Caoutchouc, or india-rubber, is the juice of many trees of tropical growth, hardened by exposure to the air. When pure it is nearly white—the dark colour of the commercial gum being due to the smoke in which it is dried. Its physical characters are too well known to need description. It is insoluble in water, although boiling water softens it and causes it to swell up considerably; it is also insoluble in alcohol. Pure ether, benzol, and chloroform dissolve it with facility, and, on evaporation, leave it unchanged. Oil of turpentine also dissolves it, but leaves it, on evaporation, as a viscid, sticky mass, which dries imperfectly. Caoutchouc is unaffected by most chemical reagents, such as chlorine, sulphurous acid, hydrochloric acid, ammonia, &c., and hence it is of the greatest use in the laboratory. Dilute acids neither dissolve nor attack it. Caoutchouc is becoming of more and more use every day. Advantage is taken of the adhesive nature of its surface to remove pencil and other marks from paper. In the laboratory it is employed in the form of flexible tubes for gas and other purposes, and in the form of thin sheets to tie over the stoppers of bottles containing absolute alcohol, or other substances, from which it is important that air be excluded; and, in the same form of thin sheets, it has been successfully employed as an illuminating medium for the dark room, permitting luminous rays to pass, but obstructing all actinic radiations. The solution of caoutchouc, in benzol or other solvent, is largely employed as a waterproofing agent; and its benzol solution also forms one of the best adhesive agents for cementing positive prints to the mounting board: for this purpose it should be of the consistency of treacle, and may be thinly smeared, with the finger or stiff brush, over the whole surface of the picture and mounting cardboard. When nearly dry, apply the two prepared surfaces together, and they will readily adhere, without giving rise to cockling. No particular precautions need be taken against soiling the face of the print or exposed part of the mounting board, as, when dry, friction with a clean piece of india-rubber will at once remove all dried portions of cement. Caoutchouc also enters into the composition of the black varnish used for backing positives, as its employment obviates the tendency to crack. The following is a good receipt:—

Caoutchouc	15 grains.
Asphaltum	2 ounces.
Benzol	5 ounces.

Dissolve by the aid of heat if necessary.

Carbon. An elementary body, solid, inodorous, insoluble, and infusible. It occurs in two very dissimilar crystallised states, the diamond and graphite; and in the amorphous or uncrystallised state, as lampblack, plumbago (erroneously called black lead), charcoal, anthracite, animal black, &c. The diamond is one of the most remarkable bodies known; its curious chemical nature having conferred upon it a high scientific interest, independent of its value as a gem. The diamond is applied to a very useful and necessary purpose by photographers, viz., cutting glass. A broken *fragment* of this mineral merely scratches the glass as a flint would, but a *crystallised edge* of diamond drawn along with a gentle pressure, causes a deep split to take place in the glass, which can then be fractured along the cut line with the greatest accuracy. No photographer should be without a glazier's diamond. The comfort and convenience of having always at hand a ready means of cutting glass into a desired shape, far outweighs the slight expense of the instrument, and the necessary facility of manipulation is soon learned. In its amorphous state carbon is employed, as animal charcoal, for the purpose of removing the dark colour which a nitrate of silver bath assumes after being used for sensitising albumenised paper or glass; it is not a good material for this purpose, as it contains many impurities, which tend to impoverish or contaminate the bath. Kaolin, or freshly precipitated chloride of silver, is far preferable, as we have previously pointed out. Carbon printing, which has recently attracted some little attention at home and abroad, in consequence of the prize offered by the *Duc de Luynes* for a successful process, must, as far as regards those plans which have yet been made public, be regarded as a hitherto unsolved problem. Carbon unites with oxygen to form two compounds, viz., carbonic oxide—a compound of equal equivalents of carbon and oxygen, CO; and carbonic acid—a compound of one equivalent of carbon and two of oxygen, CO_2. The latter is the only oxide of present importance; and, as the compounds which it forms with bases are of frequent employment, we will consider them more in detail.

(*To be continued.*)

A Catechism of Photography.

EXPOSING TO THE ACTION OF LIGHT.

Q. What description of apparatus is necessary for the purpose of printing positive from negative photographs?

A. Two pieces of glass held together by wooden clips. The lower glass should be covered with black velvet, or cloth. Frames for this purpose can be obtained at any photographic warehouse: but the two pieces of glass answer perfectly well.

Q. How is the operation of printing conducted?

A. The glasses must be thoroughly cleaned; the negative photograph must then be placed in immediate contact with the prepared paper, and both be closely pressed together. The glasses which contain the paper must then be exposed to the light, and the perfect picture is gradually produced.

Q. What length of time is necessary for printing photographs?

A. This depends on the density of the negative and the power of the actinic ray; and the time may vary from ten minutes to an hour, or even more.

Q. As a general rule, are those photographs best which are printed rapidly?

A. No, the best negatives print slowly; and the best pictures are those which are very gradually developed.

Q. What is the colour of the photographic print?

A. The colour varies, being in a great measure dependent on the mode of preparation, and the length of the exposure to light.

Q. In what respect do the colours of photographs vary from each other?

A. Some are of a greyish blue, others of a lilac, others again of bluish brown, of black, of sepia, bistre, &c.; albumen produces a rich chocolate brown, and ammonio-nitrate paper a dark slate blue.

Q. How can the operator ascertain when the positive impression is sufficiently strong?

A. The frame may be opened and the proof examined; but when this is done, the utmost care is necessary in replacing positive and negative exactly in their previous position. The development of the picture must be regulated by a regard to the subsequent processes of toning and fixing. When the positive is removed from the frame the tints all appear darker than they are intended to remain. This is reduced by the toning bath. The acid toning bath acts more rapidly than the neutral bath of chloride of gold; and it is essential to take this into consideration with regard to the intensity of the impression.

FIXING.

Q. How is the permanency of the positive photograph secured?

A. By fixing.

Q. How is this operation performed?

A. On being removed from the printing frame the positive proof is plunged into a solution of hyposulphite of soda:—

Water	5 parts.
Hyposulphite of soda	1 ,,

Care must be taken to avoid the formation of air bubbles in immersing the photograph. On examination the transparency of the proof appears defective, and, in some parts, almost opaque, but this opacity rapidly disappears in the bath, and, after a few minutes, the picture becomes perfectly transparent, the salts of silver having been dissolved by the action of the hyposulphite of soda. The proof is then fixed; and if it were possible to preserve it in this condition after the various washings which it has subsequently to undergo, its permanent solidity would be secured.

Q. Is not the solution of hyposulphite calculated to secure the permanency of the picture?

A. No; unfortunately in the bath it takes a disagreeable tint, which has afterwards to be removed, and which removal cannot be effected without having recourse to other operations.

Q. How does this difficulty arise?

A. Through the hyposulphite of soda becoming, after a short time, so far saturated with the salts of silver as to contain an excess of hyposulphite of silver, which imparts to the paper a greenish colour, and an opacity of texture very difficult to remove. If the bath is new and pure, the salts of silver are rapidly withdrawn from the proof, but if this is not the case, the results are most injurious.

Q. How is this difficulty to be avoided?

A. By employing a new hypo. bath very frequently, and by not attempting to fix a large number of proofs in the same bath, but by allowing plenty of room for the proofs to float freely in the bath.

Q. How much of the silver is removed from the proof in the hypo. bath?

A. About ninety-five parts out of every hundred. Thus, five parts remain on the proof, and ninety-five are dissolved in the hypo. bath. It is obvious, therefore, that every operator, on the ground of economy, should recover the dissolved silver from his old hypo. bath.

THE TONING BATH.

Q. How is the toning bath prepared for positive photographs?

A. The formulæ given are numerous. The most simple is that of the neutral chloride of gold without the addition of any acid:—

Distilled water	1000 parts.
Chloride of gold	1 ,,

Q. Is the proof immersed in this solution previous to being placed in the hypo. bath?

A. Yes; on being removed from the hypo. bath the proof is thoroughly washed in clear water, so as to take from it every trace of hyposulphite of soda; it is then placed in the toning bath, and allowed to remain until the desired tint is obtained.

Q. Will it, in course of time, take any tint that the operator may wish?

A. It will take any of the photographic tints, such as we have already named, by a slight modification of the toning bath.

Q. Mention one of these modifications.

A. Very good results are obtained in changing red-brown proofs to a bluish black, by the use of the following solution:—

Water	500 parts.
Chloride of gold	1 „

To this add—

Water	500 parts.
Hyposulphite of soda	200 „

About a quart of the fixing liquid being thus obtained, the proof, on its removal from the frame, is plunged into it, without the ordinary hypo. bath. This process answers well, but is expensive, as the fixing liquid is very soon unfit for use.

Q. What other formulæ are recommended for the toning bath?

A. In place of mixing the chloride of gold with the hyposulphite of soda, the crystallised sel d'or is sometimes used, in the proportion of half a grain to an ounce of water. The chief objection to this is the expense.

(*To be continued.*)

Correspondence.

THE STEREOSCOPIC EXCHANGE CLUB.

To the Editor of "The Photographic News."

Sir,—I am glad to see in the last number of the "News" that you propose to print a list of your subscribers who are willing to exchange stereograms with each other, and shall be much obliged if you will kindly insert my name and address in the proposed list.

I wrote to you some time ago on this subject, when you were good enough to insert a note in the "News" in which I offered to exchange a print or two with any amateur who had been working Fothergill's process, the result of which note was, that prints were sent me by the dozen from all quarters, at once proving the extended circulation of the "News" and the desire on the part of amateurs, at least, to adopt some means of comparing their productions with those of their brother amateurs.

Many of the prints sent me were desperate rubbish, and were at once carefully deposited in the fire, and though it was a hardship, I considered myself bound in honour to return an equal number of my own prints. Would it not be a good plan to suggest that each person desirous of having his name inserted in your list, should send you a print or two as a sample of what he proposes to give in exchange; and if such samples were not up to the mark, the non-insertion of his name would be a gentle hint that he ought to think less of his productions, and strive to do better for the future.

With my last communication, I sent you a couple of prints, which you were good enough to make a favourable note of, but in case you have forgotten the matter altogether, and acting on the foregoing suggestion, I again inclose you two prints; they are not what I consider my best productions, but simply an average sample of what I could send in exchange for any that might be sent me.

I would further suggest that the process by which the negative was obtained, should be noted on the back of each print, and the name of the sender; there will be no occasion for the address, as that can be obtained by reference to your list in the "News."

Your obedient servant,

Archibald Burns.

4, *Calton Hill, Edinburgh.*

[In accordance with the above, and other suggestions from correspondents, we may find it advisable to slightly modify the regulations which we published in the last number; in this case we intend publishing our amended suggestions in our next week's impression.—Ed.]

PRIZE MEDALS.

To the Editor of the "Photographic News."

Sir,—Long ere this reaches you, you will no doubt be aware that our prize medal adjudicators have awarded the medals to the most successful competitors, and that the fortunate—or unfortunate—recipients of these awards are respectively the Rev. T. M. Raven and Mr. Lyndon Smith, of Leeds. The former has carried away the "member's medal," the latter has received the "stranger's medal." As to the respective merits of the prize pictures, I will say nothing,—that is not my object in writing to you. You have in your capacity as journalist frequently had opportunities of reviewing the works of these gentlemen. Of the productions of the latter you have expressed a high opinion;—while of the former, in your review of the last exhibition, you wonder "what could have induced him to exhibit his two views—'Pierrefitte,' and 'View near Luz,' as there is not the slightest pretence to anything like detail in them." Now, I am not for one moment going to say anything about the photographs, or to say that there were not photographs in our exhibition quite as good as those to whom the awards were made. What I wish to do is simply to state that this prize medal system has been fraught with great evil, and has given a great amount of dissatisfaction. I wish you to write down the principle as a bad one; this I need scarcely urge upon you, since you have done so already. When the matter of prize medals was first announced, you stated in a most prophetic manner all the difficulties and annoyances which have attended it. In a series of articles entitled "Approaching Exhibitions," you with singular foresight threw out a series of suggestions which it would have been prudent to have acted upon, had the parties to whom they were addressed only paid attention to them. The first suggestion made in those articles was the necessity of an unqualified rescinding of a resolution passed by the Photographic Society, prohibiting photographs from the exhibition which had been exposed in the shop windows. This suggestion was fought against time after time by the society's journal, but ultimately the Photographic Society was completely beaten; they were obliged, at the last moment, to do as you suggested. In the same article you pointed out the difficulties of the medal question; while in a subsequent article you suggested the formation of a collection of photographs, showing the progress of photography from the earliest date down to the present. This passed unnoticed, until His Royal Highness the Prince Consort, seeing the great importance of such a step, took the opportunity of calling the attention of the council to the matter on the occasion of his visit to the exhibition, and now they begin to see the desirability of your original suggestion. Having made this slight digression, I now come again to the question of the medals, and again beg you to call the attention of photographers and photographic societies to the matter, and let them learn and profit by our experience here. I hope that the Edinburgh affair will be the last that we shall ever hear of the prize medal question.—I am, Sir, your obedient servant,

S. J. W.

Edinburgh.

Photographic Societies.

The French Photographic Society.

At the last meeting of the French Photographic Society, M. Regnault in the chair, after the election of certain members, M. C. Chevalier presented a series of proofs of different groups and studies taken in the East, by Col. Nostitz, in the Russian service, by whom they had been forwarded; and M. Delahaye did the same on behalf of M. Stalie, of Pernambuco. These proofs represented different types of individuals, monuments, and landscapes, taken in Brazil, and it is intended to hang them in the forthcoming exhibition.

A letter was then read from M. Cognacq (vide "Photo-

GRAPHIC NEWS," of vol i. p. 290. The following is in substance the reply of MM. Davanne and Girard:—That they had never pretended to have discovered a new property in chloride of calcium; and that, in addition to that substance, they mentioned chloride of zinc, carbonate of potassa, and generally all hygrometrical substances, the existence of which has been long known. What they showed was, that prepared paper kept in a place perfectly dry, and protected from light, would keep good for an indefinite period. Also, they claimed priority in the discovery of the use of chloride of calcium, inasmuch as, even if M. Cognacq was the first to use it, he kept it a secret. M. Paul Perier then read a letter from M. Marion, in which, after refuting the accusations made against him, of having appropriated M. Cognacq's discovery by deception, he concluded thus:—"I don't pretend to ascribe to myself the discovery of the use of chloride of calcium, and its preservative action on nitrated papers. I leave this to whom it belongs of right. I have merely invented a convenient apparatus, an invention which nobody can dispute with me, and for which I have taken out patents in France and England. My invention consists chiefly in a frame furnished with a wire,-cloth, and muslin on one side, in which I place the chloride of calcium, which is kept there by means of folds of paper, which are fastened on the opposite side by means of a sheet of zinc or pasteboard. This absorbent is fixed in the box in which the nitrated paper is to be preserved. I have made boxes of tin, closing hermetically, and properly arranged for receiving the absorbents; but those who desire to make their boxes themselves can buy these absorbents of me very cheap, and ready prepared. It should be thoroughly understood that my invention rests specially on the apparatus. Now that I have given these explanations, I will add a word on the observations I made in trying the apparatus I have constructed. I observed that the absorbing action of fused chloride of calcium is not so great as that which is merely dried. Hence it results that the paper which was placed in the box I deposited with the Society two months ago should be less perfect than if it had been placed in one of those I make now, because in these it is the latter kind of chloride of calcium which I use, having found it much preferable to the other."

The following report was then read by M. Paul Gaillard, in the name of the commission appointed to examine and report on Marion's preservative apparatus:—

"Gentlemen,—You have charged us, MM. Bayard, and myself, with the task of opening the boxes intended to preserve the sensitised paper, deposited by M. Marion at the last sitting of 1858. The following is our report on the paper it contained:—

"A month after preparation, the non-albumenised chlorided paper was preserved almost white; the albumenised papers had all acquired a more or less nankeen colour, but which did not seem to detract at all from the value of the positive proofs, especially when the precaution was taken to pass them in the iodo-cyanide bath after the hyposulphite as suggested by M. H. de Molard. In preserving the paper but eight days, and without opening the box during that time, the paper was sensibly white; and after the lapse of two months it still yielded a satisfactory proof.

"As to the negative paper, we took a proof on waxed paper which had been sensitised a month, and we found no difference between it and that sensitised on the previous evening.

"The process appears to us to be destined to render important services to photographers, by allowing them to prepare at one time a certain quantity of paper, without fear of losing it if time or pressure of business will not allow of its being used directly."

The commission proposed that the thanks of the Society shall be given to M. Marion for his communication, which was accorded.

M. Mailand then read a report on the financial position of the society; at the same time presenting a balance sheet of the accounts in all their details. This report showed that the finances of the society are in a flourishing condition. As a consequence of this prosperity the committee of administration proposed—

1. The foundation of a reserve fund formed of six-tenths of the balance of the receipts.

2. The foundation of a special fund for prizes and encouragements, formed

a Of three-tenths of the balance of the receipts.

b Of the net product of the public sale of the proofs given specially for this purpose.

c Of donations.

3. The foundation of a relief fund, formed of one-tenth of the balance of the receipts, and of donations.

These propositions were put to the vote and carried. After which a certain number of the retiring members of the committee of administration were re-elected.

M. Le Gray next presented some proofs toned by the process described at p. 253, vol. i. of this journal, and accompanied it with certain explanations which will be given in our next impression.

MM. Davanne and Girard also read the continuation of their paper on photographic positives; for which they received the thanks of the society.

The next communication was from Mr. Maxwell Lyte, and related to the conditions of the sensitive film in all negative processes, whether on collodion or on paper; it was as follows:

"I believe MM. Barreswil and Davanne were right when they showed that it was not the iodide of silver, but the nitrate which was in contact with the iodide, which by its decomposition produced the blacks of the image. But I go even further than they. It is probable that the iodide of silver, when it is dissolved in a nitrate bath, forms a chemical combination with the latter, and to demonstrate more clearly the existence of this combination, it ought to be mentioned that by adding iodide of silver to a highly concentrated solution of nitrate, the iodide is dissolved, but that after the lapse of a few minutes the greater part is re-precipitated under a crystalline form, and even that which is not dissolved becomes crystalline after the lapse of a certain time. I believe that a similar combination is found in the sensitive film, but amorphous instead of being crystalline. Indeed, the same sensitive properties are found in both the amorphous and the crystalline when the proof blackens in the developing bath after exposure to the light. Only the crystalline deposit is not so sensitive as the amorphous, owing, perhaps, to its crystalline condition.

"Under these two forms the *iodo-nitrate* (if we may so term it) decomposes instantaneously if an attempt be made to wash it in water; consequently it cannot be deprived of its excess of nitrate of silver, and therefore cannot be analysed.

"In washing the crystalline iodo-nitrate with water, it loses its nitrate, becomes a powder, and insensible to the light; by washing the amorphous iodo-nitrate of the sensitive film for a long time it loses its sensibility and becomes paler in proportion as it loses its nitrate. It is to be remarked also that the excess of iodide of silver, in presence of an excess of soluble iodide, is of a pale yellow; while the same iodide, in presence of an excess of nitrate of silver, becomes of a deeper yellow and much more brilliant.

"I consider, as I have just explained, that the iodo-nitrate exists under two conditions: the one crystalline, the other amorphous; and that this latter, which is found in the sensitive film on its withdrawal from the silver bath, is that which gives it its sensitive properties; and thus it is necessary to shield it from decomposition when it is desired to preserve the film in a sensitive condition. Here you have the reason why practice has laid down certain rules for the preparation of the collodionised film, and for its preservation in the sensitive state.

"We ought not to employ a nitrate bath, the richness of which is greater than 7 per cent., otherwise the iodide dissolves, and is reprecipitated in a crystalline state. Neither, for the same reason, should the glass be allowed to dry with the excess of the bath on its surface.

"The glass cannot be washed in water without danger of altering the iodo-nitrate on its surface, and of destroying its sensibility. Hence the employment of substances like honey, metagelatine, albumen, and mucilage, which can, by their syrupy condition, envelop the molecules of iodo-nitrate, and shield it from being washed off with the excess of free nitrate."

. . . .

The thanks of the Society were accorded to Mr. Lyte.

At the termination of the reading of Mr. Lyte's communication, M. Girard pointed out that M. Alfred Riche published in May of last year in the *Journal de Pharmacie et de Chimie* a note in which he described the preparation, and gave the analysis, of an iodo-nitrate of silver of the formula $Ag\,I, 2\,Ag\,O\,N\,O_5$, obtained by him by simply dissolving the iodide of silver in the nitrate of this metal.

M. Gaumé addressed a note on the method employed by him for the preservation of nitrated papers, and on the application to the obtaining of negatives, of the method he has already made known for the preparation of positive proofs.—*Condensed from the Bulletin of the French Photographic Society.*

Photographic Notes and Queries.

PORTABLE TENT.

Sir,—As you appear always willing to insert in your useful journal any real improvement relating to the chemical or mechanical department of photography, I send you a description of an extremely portable and effective tent. I have been using it for more than a year and a half. It will carry the tripod stand, a whole plate camera, and more chemicals than can be used in a day's work. I have two racks for the bottles, and, as I know what it is to be hard up in the field, they are five ounce ones, and consist of collodion, bottle varnish, cleaning solution, ether, cyanide of potassium, and beaker for pouring on the developants; the other rack contains two eight ounce bottles for developant and fixing solutions. After much practice I find that with those chemicals I am never at a loss; but I should not like to start on an excursion with less.

The apparatus consists of a folding tripod stand, on which the tent is fixed to suit the height of the person using it: it is a box made very lightly, the ends only being of half-inch stuff; the outside measurement is, length 25 inches, breadth 18 inches, and thickness 6¼ inches: at each corner there is an upright hinged, the right-hand one folding over the opposite one, and when it is going to be set up, the lid is supported by one hand, whilst the other fixes the uprights, which, when raised up, fit into holes in the lid, which, being held down by the intervening two thicknesses of yellow, and one of black calico, the whole is quite firm. In the front side of the calico, a large hole is cut having a strip of velvet about six inches wide, with strong elastic at the inner edge sewed to it, through which, when working, I thrust my head and shoulders, and being buttoned up in two places, the light is quite excluded; at least, I and others have taken many brilliant pictures with it in the brightest sun without the least sign of fog about them: in the lower side at the back there are two windows of yellow glass which enable you to see perfectly, and there can be an opening cut in the black envelope if thought necessary. When fully packed with the whole plate camera, and its bath inside, and the tripod strapped on the top, the weight is about two stone, and I can carry it on my back like a knapsack by means of two broad straps; the camera tripod, which I take in my hand, assisting me in getting it on. I have frequently gone a distance of three or four miles and back, carrying everything myself, without feeling tired. The box for greater security is covered with oil cloth, and bound at the corners with metal.

S. Maddison.

WATERPROOF AND LIGHTPROOF MATERIAL FOR TENTS, &C.

Sir,—Perhaps some of your readers would be glad to know of a method of preparing, at a moderate price, a perfectly light-tight and waterproof material well suited for covering portable tents, &c. I can confidently recommend it to the attention of the writer of the article entitled "The Wet *versus* the Dry Process," which appears in the first number of your second volume, for it is equally well suited for a waterproof coat. Boil *Stockholm tar*, and keep it at a boil for about a quarter of an hour; let it cool, but before it becomes cold enough to be too thick, add, little by little, good spirits of wine, in sufficient quantity to bring the mass to the consistency of oil paint. When quite cold apply with a paintbrush, and in the same manner as you would paint, a *thin* coat on whatever material you select; do not apply a second coat till the first is thoroughly dry; and finish with a third. It will take some days for each coat to dry properly, and the material had better be hung up in an outhouse, where it can get air, *but be protected against dust.*

The smoother and finer the material is upon which this coating is spread, the better the result will be; and a rough foundation requires even four and five coatings before it is what I call finished. I find for an *over-all coat* that "half-crown linen," as it is called, answers best, being nice and fine on the surface, light, and, consequently, more portable when finished. Silk would be the best of all, though dear; but common cotton stuff can, by four coatings, be made good enough for many purposes. Care should be taken in boiling the tar, that it is not done too quickly: as, if it boils over, and, consequently, takes fire, it is a most dangerous thing to deal with—almost impossible to extinguish. The boiling had therefore better be done in the open air, by making an impromptu fireplace with a few stones. I had this receipt from an old navy officer, and I have often proved its efficacy under a coat of his preparing, now in constant use for six years, and, seemingly, as good as new. Geo. Dunn.

OBTAINING PHOTOGRAPHS OF CHALK DRAWINGS.

Sir,—Will you kindly help me out of a difficulty? I have a number of large chalk drawings of landscape scenery to copy on the half-plate size (negatives), and I find considerable difficulty in getting the negatives sufficiently intense with the proper amount of exposure; the white margin of the drawing and the sky come much too transparent, so that, when a print is taken, there is no purity in the whites, and the proof presents a dirty appearance. If I expose a less time, I get an intense negative, and the margin and sky black enough; but then I find the deep shadows are all under-exposed, and there is no half-tone, and the print does not properly render the drawing; so that I find, when I expose just the right time to give half-tone and the proper amount of strength in the shadows, the sky is over-done, and the white margin also.

Now, how can I obtain proper gradation and yet keep the sky and margin sufficiently intense in the negative to print clean. I use a combination portrait lens, 3¼ inches in diameter, with stop in front the size of a shilling, and develop with pyrogallic acid, 1½ grains to an ounce—if stronger, it does not appear to give any better result.

A. B.

[The plan which we think will answer our correspondent's purpose best, is:—Employ a nearly colourless collodion, containing a *bromide* in addition to an iodide, as recommended in previous numbers of the "Photographic News." Expose a sufficient time to bring out the half-tints: develop with positive developing solution prepared with sulphate of iron; and, as soon as all the half-tones and detail are well out, wash off and fix; then wash very well, and pour on and off several times a mixture of pyrogallic developing solution, and a few drops of nitrate of silver: this will increase the intensity to any desired extent, and will, we think, entirely obviate the difficulty complained of by our correspondent.—Ed.]

MR. LYTE'S NEW GOLD TONING PROCESS.

Sir,—Oblige me by pointing out the cause of failure in the inclosed proof. It was toned by Mr. M. Lyte's process ("Photographic News," vol. i. p. 301), and for the first hour everything seemed most satisfactory. It was removed from the toning bath when of a rich purple colour, and in the fixing bath (fresh hypo.) assumed a rich brown; but on proceeding to wash it, and after a few changes of water, it was found in the ruined condition in which you see it—the sky and water being utterly spoiled. I feared to keep it longer in the toning bath as I did not wish to obtain the black or grey tone. Everything would have been satisfactory about this had not this abominable mealiness and discoloration supervened.

The mischief looks vastly like sulphide of silver; perhaps the print ought to have remained longer in the fixing bath.

A Wax-paper Man.

[The fixing bath was either not strong enough, or the hyposulphite of soda was not pure. The granular discoloration in the pores of the paper is owing to the presence of sulphide of silver arising from the decomposition of the hyposulphite of silver in the pores of the paper before the excess of hyposulphite of soda dissolved it out. It is an occurrence frequently met with, and is to be obviated by employing a stronger fixing bath.—Ed.]

SLATE BATHS.

Sir,—Observing in a recent number of your paper that one of your correspondents alludes to slate baths, I beg to send you the plan of one I constructed some time since. It has, I think, three good points—simplicity, cheapness, and strength, and is made as follows:—Take two slabs of thin slate, say about ¾ of an inch larger at the sides and bottom than you intend the interior of the bath to be when finished; up each side of both slates and also along the bottom, say about a ¼ of an inch or so from the edge, drill a few holes through which thinnish screws can pass, then take a piece of gutta percha and mould it about ¾ of an inch wide, and as thick as you desire to separate the sides from each other (about ¾-inch at the top and ⅝ or ½ an inch at bottom is a good size); the gutta percha is then cemented round the sides and bottom of the bath, between the two slates, and, to make all secure, a strip of wood is placed at each side and screws passed through the holes in the slates and through the gutta percha from side to side, taking care, of course, not to screw up too hard, or the slate will break.

J. I. H.

PENETRATING VARNISH.

Sir,—One of your correspondents asks for a formula of a penetrating varnish: the above I am not able to give, but a substitute, which will answer his purpose equally as well, if you think it of any use.

After taking a picture by the alabastrine process, and varnishing with the chloroform and amber varnish, you can *sink* any amount of colour by holding the bottle containing the varnish in your hand to make it warm, and then pouring *the vapour* on the coloured surface, which immediately penetrates it, so that the colour will be as plain on the reversed side as upon the collodion side; by re-colouring and sinking two or three times in succession, you can get any amount of intensity of colour.

W. J. W——x.

RESTORATION OF EXPOSED DRY COLLODION PLATES.

Sir,—In reply to your correspondent "Durham," vol. i. p. 249, I beg to state that the length of time occupied by exposed plates in returning to their normal condition is such as to preclude the practical application of the system in the restoration of plates accidentally exposed.

It would indeed be a very undesirable condition if it occurred quickly, as plates could only be kept a limited period between exposure and development.

Your correspondent will, however, be glad to learn that dry plates admit of very simple and expeditious restoration to their sensitive state by wetting them with a dilute solution of nitric acid, say one ounce to twelve of distilled water, and permitting them to dry spontaneously.

Hill Norris, M.D.

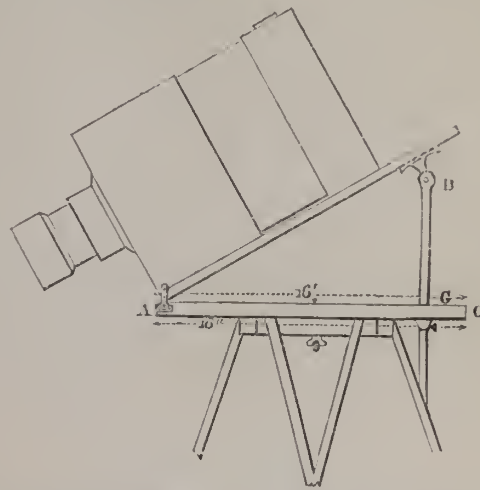
STAINED FINGERS.

Sir,—Finding that a remedy for stained fingers is still a desideratum amongst ladies and gentlemen practising the charming but rather "black art" of photography, permit me to suggest to them to remember that "prevention is better than cure," and to exercise their chemical skill in devising "*a collodion*" wherewith to coat the tips of their lovely fingers before they begin to work, and a solvent to remove it, when the dressing bell rings for dinner.

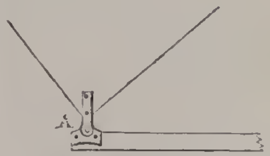
Suggestor.

APPARATUS FOR DEPRESSING THE CAMERA.

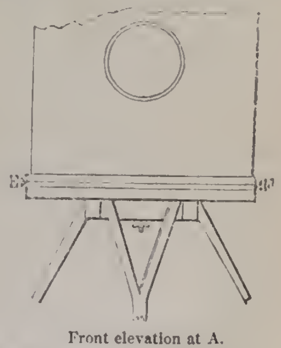
Sir,—Thinking that many of your readers may have suffered an inconvenience arising from not being able to depress the camera sufficiently, as, for instance, in taking views from windows of any height from the ground, allow me to send you a small contrivance for obviating this difficulty.



A C consists of a deal board 16 inches long, and 8 inches broad, with a round hole at *g* through which slides a long piece of wood, fastened by means of a ball and socket joint to the tail-board of the camera. E and F are two brass loops through which, and two similar ones on the camera, passes a long iron acting as a pivot.



Enlarged view at A.



Front elevation at A.

By this means the camera can be depressed to any required angle.

A. W.

ANSWERS TO MINOR QUERIES.

Testing the Purity of Wax.—*A. Henderson.* Wax is one of those articles of commerce which is very generally adulterated. Indeed, as usually met with in the form of thin round tablets about 4 inches diameter, it is not an uncommon thing to find it adulterated to the extent of *at least* 50 per cent. The following method of testing wax for impurities, is taken from Bolley and Paul's excellent "Manual of Technical Analysis." The probable impurities and adulterations are:—*tallow*, indicated, when the amount is considerable, by the inferior consistence and greasy feel of the wax; by the absence of granular fracture; and by the taste when chewed. The distillate from wax, containing only two per cent. of tallow, gives, when shaken up with water and filtered, a liquid from which acetate of lead throws down a precipitate, while this is not the ease with pure wax. *Stearic acid*, indicated, when the wax is boiled with lime water, by a precipitate—stearate of lime—that remains suspended in the liquid, and by the neutralisation of the lime. *Resin*, indicated by the inferior brittleness of the wax and by its adhesiveness. The resin is separated by alcohol. *Starch* or *meal*, *earthy substances, &c.*, indicated, when the wax is dissolved in turpentine, by an insoluble residue, which is further examined to ascertain its nature. In order to estimate the amount of stearic acid in adulterated wax, a known quantity is boiled for a few minutes with a solution of carbonate of soda in 50 parts of water, alcohol added until the liquid becomes clear, the insoluble portion separated by straining through linen, washed with water, melted, and weighed. The loss of weight represents stearic acid.

Splitting a Positive Print.—*Despair* has succeeded in staining the back of a valued positive print in such a way that the marks show through and disfigure the lights of the picture; and asks our assistance in suggesting some remedy before the print (which cannot be replaced) is mounted. Our correspondent is fearful of employing cyanide of potassium, as a preliminary experiment on another print showed that there was a likelihood of the cyanide eating away the picture through the paper. The only plan that we can suggest to our correspondent is, to *split* the sheet in half. Mr. Leighton, who was, we believe, one of the first persons who succeeded in dividing a sheet of paper, has given very clear directions how this is to be accomplished: he states that two leaves of paper harder and slightly tougher than the one to be split are to be obtained; the three are then to be firmly pasted together (*à la* sandwich) with stiff clean paste free from lumps. Rub them well when first placing them together, in order to get rid of air bubbles, and allow to dry spontaneously in a moderately warm room. When quite dry, gently draw apart the two outer leaves, and if care be taken to *start* the splitting of the inclosed sheet fairly, it will divide equally, leaving one half firmly pasted to each leaf. It now only remains to soak the papers in warm water until the paste is softened, when the thin split sheets may be removed, washed, and dried. We should think that if calotype negatives were treated in this way, they might be much improved, as half of the paper with the irregularities and opacity would be removed.

TO CORRESPONDENTS.

Proposition for Exchanging Stereoscopic Pictures.—On the 8th of April we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed, a picture be forwarded with it. We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score. The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

E. P.—The reason of the mottled appearance on your print is, that you have not a sufficiently strong nitrate bath in making it sensitive; you should have followed *all* the formulæ at vol. i. p. 298.

H. Manley.—We are much obliged for the extract about Mr. Hill's process for daguerreotyping in natural colours. His process is an *American* one; and has been shown long ago to be incapable of effecting what it promised.

Count Wencierski.—Received.

H. S. I.—Received: it shall be inserted. Your two queries will be answered in our "Minor Queries."

T. T.—1. The nitrate of silver could not have been pure; otherwise a new bath with so much nitric acid in it would not have given foggy pictures. As a remedy, try sunning it, as described in our first volume. 2. The front lens of a portrait combination may be used for landscape photography if fitted into an appropriate mount, with the convex side turned towards the ground glass of the camera; but such lenses are not so good as those made especially for landscape purposes.

Kalos.—1. A single lens. 2. Aplanatic. 3. Yes; but we do not know the publishers. We would willingly give prominence to the paper process if such were the desire of our readers; but we find that for one advocate of the calotype process there are a hundred glass photographers. Perhaps if "Calotype" were to give us the results of his experience on paper, he might win over others to give his process a trial. For our part, we are great admirers of a good paper negative.

Photo. Beyond Railways (answers to queries on the bichromate of potassa process, vol. i. p. 282).—1. Thin starch paste either brushed or floated on for a minute or two. 2. It may be ironed. 3. A saturated solution of iodine in water (very little will dissolve). 4. The blue tint will be produced as soon as the iodine comes in contact with the starch. The subsequent washing is merely to get rid of the excess of materials used. 5. A saturated solution may be used. Dissolve 1 part of bichromate of potassa in about 10 parts of water. 6. More analogous to the developing agent. 7. The gallo-nitrate solution will not keep good many minutes; consequently only sufficient should be made at one time to serve for present use. 8. We have reason now to believe that the *lauded* discovery of the Lyons chemist, was a *canard* of one of our foreign contemporaries.

J. C. **Twyman.**—We are much obliged for the three instantaneous stereograms. They are very beautiful specimens of marine photography; although not, perhaps, so rapidly taken as some which we have seen. A description of the process employed would be of interest to our readers, as the manipulations for instantaneous photographs are not generally understood.

Viator.—Our correspondent's ideas and suggestions on the subject of Pho-Topography are very good, but hardly in a sufficiently connected form for us to lay before our readers. If he will favour us with a letter showing how the suggestions might be best carried out, we shall be greatly obliged.

O. G.—We have heard many good accounts of the lenses, but having never practically tried them, we cannot give much of an opinion on the subject. The curvature of the field is rather large according to your experiment, but, as you say, the imperfections arising from this will be in some measure remedied by using smaller apertures.

A Pupil of the "Photographic News."—Received with thanks.

A. R. P.—Send a stamped and addressed envelope, and we will communicate with you.

A Positive Man.—Most of the hints on stains and streaks, which are given in our remarks, will apply to collodion positives as well as negatives.

Z.—There would be objections to the plan you suggest which more than outweigh the advantages.

J. C.—1. We prefer the bellows form of camera; it will do very well for portrait purposes if provided with a double combination lens. 2. The aplanatic.

R. H. V.—All your questions have been fully answered in our first volume. Consult the index.

H. H. **Allan.**—Shall we insert your name in the "Stereoscopic Exchange Club," now forming? Your pictures are very beautiful, and speak well for the process you employ. Is it one of the usual processes or a modification? If so, we should like to lay the particulars before our readers.

J. W.—The substance obtained would be metagelatine, if you followed the instructions given by Mr. Heisch.

H. **Eldridge.**—Try the amber and chloroform varnish.

A. X.—We think that many superior developing boxes or tents have been from time to time communicated to our columns.

Quiz.—1. It will keep until the gold is exhausted. 2. Send your prints to a wholesale stationer's, who will hot-press them for you.

T. **Tedrake.**—Your letter is received with thanks; but as that subject seems now satisfactorily settled, we think no good would arise from a renewed discussion.

J. C.—Your suggestions shall receive consideration.

Dr. Tamers.—Received.

H. E. N.—Received.

A Photo.—From the description you give of the appearance (which, however, we cannot clearly understand), we should imagine your bath required acidifying.

E. J.—1. The effect you describe can be produced by using a perfectly black background. 2. We regret we cannot give you the particulars you ask for. 3 Photographic chemicals should be kept cold and in the dark, as a general rule, although exposure to light will not injure some of them. The operating room and baths therein should be of a comfortable temperature, neither too warm nor too cold.

W. **Brooks Reynolds.**—Received.

Ignoramus, will receive a reply in our next.

Nitric Acid.—1. 30 grains of salt to the ounce of water. 2. 20 parts of nitrate of silver to 100 parts of water. 3. The chloride of gold should be neutralised with carbonate of soda. 4. The Spanish white is for the purpose of neutralising any acid which may possibly be formed in the bath; chalk will answer the purpose equally well. 5. Add two or three ounces of salt to a gallon of water.

Sanger.—1. We cannot account for the appearance in the least, some of your chemicals must be impure. 2. The toning bath is unfit for use, and should be discarded in favour of a fresh one.

M. H. **Crury.**—From your letter we imagine that you have been trying to obtain negative with positive collodion and developing solution. This you will find great difficulty in doing at first, although an experienced operator might sometimes succeed. The nitrate bath should be very faintly acidified with acetic acid, and the ordinary pyrogallic developing solution (as given in previous numbers) should be used; do not try citric acid for the present, but use acetic acid.

Anna Photo.—See article on *Copying Camera* (vol. i. p. 132), also articles at pp. 72 and 294 in the same volume. This is all the information we can give from your rather vague question.

J. H., **Jun.**—Your chloride of gold was acid; make it perfectly neutral, or even slightly alkaline with carbonate of soda, and you will find the bath will work well. We think, from your short description, that your developing camera must be a very good one; and we shall be pleased to receive an account such as you promise.

J. C. **Dear.**—Received with thanks.

A Beginner.—The annoyance of blisters in collodio-albumen is one of the great drawbacks to beginners in this beautiful process. Several practical hints on this point have been given in our first volume by experienced operators, and we cannot advise our correspondent to do better than follow their directions.

A Subscriber and Well Wisher.—A receipt identical with yours was published in our pages, vol. i. p. 56. We are, however, much obliged for your courtesy in sending it.

T. **Clark.**—Received with thanks.

Communications declined with thanks:—Post Office.—A Sanderson.—A. P. C.—S. E. N. O.—Hypo.—J. T. P.—Alhambra.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Mr. J. A. M.—A Beginner.—X.—Sheffield.—T D.—Sugar of Lead.—Photo.—Seneca.—M. T L.—V. E. Saus.

In Type:—H. Bellini.—F. S.—P.—John Rowlinson.—W L. Scott.—An Amateur.—P. R. Innes.—Spanish White.—T.—Beta.—Multum in Parvo.—X. P R.—T. Gulliver.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 2d.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 30.—*April* 1, 1859.

THE EFFECTS PRODUCED BY ENLARGING THE APERTURE OF THE PHOTOGRAPHIC LENS.*

BY THOMAS GRUBB, ESQ., M.R.I.A.

Before entering upon the subject of the present communication, it may not be amiss to remove any misapprehension which may have arisen from the title given. I am not going to enter at present upon the question which has given rise, in other localities, to rather angry discussion, viz., that of the fitness (or unfitness) of portrait lenses of larger apertures for the work for which they are intended, although this branch of the subject is one which the section of fine arts in conjunction with the Photographic Society seems highly fitted to discuss. Neither do I purpose to revert to another branch which I have already treated in a paper published in the London *Photographic Journal*, viz., the *inevitable* definiteness of focus of a lens, corresponding to its aperture and focal length. The present paper is intended to be confined to the consideration of those effects in the photographic picture depending upon varying the aperture of the lens, this aperture being (comparatively speaking) small, or, in other words, ranging between the largest and smallest aperture used with a "view" lens.

Photographers in general recognise two effects (only) as produced by varying the aperture of the lens, viz., increased distinctness, combined with slower action, by a lessening of the aperture, or these same inverted by increasing it; thus, we not unfrequently hear it asserted that when "still life" only is to be copied it is of little consequence how small the aperture used is, as, by giving increased time of exposure to the sensitive surface in the camera, the resulting picture will be similar in all points to one obtained by using a larger aperture of the lens, and giving a shorter exposure to the sensitive surface.

It is this commonly received opinion which, as I deem it to be erroneous, I desire here to combat. I apprehend that, as photographers become convinced that *there is* an effect due to aperture, their pictures will become more artistic—that we shall have pictures which have been taken in sunlight, *to represent such*, rather than moonlit ones—that we shall have photographs giving more of breadth and solidity in the foregrounds, and air and perspective in the distances—in short, that we shall have more of a picture and less of the present peculiarity of the photograph.

A photographer prides himself on the truthfulness of his work in its details. This is very well in itself, but it should cause him to recollect that such as is the image given by his camera, such should be expected in the general effect of the photograph derived from that image. Now let him place his camera, on a fine bright day, before, say, a landscape, and, if possible, *within a room*, or at least so that instead of examining the visual picture bit by bit with the discomforting aid of a focusing cloth, and perhaps with the addition of a magnifying glass, he shall be sufficiently removed from the light to take a general view of the visual picture as received upon the greyed surface; and let him also provide an assistant to change the stops, without requiring himself to leave his post at the camera. Matters being so arranged, let him observe the visual picture or images as produced by various apertures, which latter should range in diameter from at least $\frac{1}{15}$th of the focus of the lens for the largest—*e.g.*, 1 inch diameter for 15 inches focus of lens—down to the least he desires, even to that lately proposed to be used with an improved (?) lens, viz., $\frac{1}{8}$th of an inch diameter for a focus of 8 inches, or say $\frac{1}{64}$th part of the focus, and, the results being noted, I think there will be but one opinion, viz., that each step in the reduction of the aperture of the lens is accompanied, not only by a reduction of the brilliancy of the images, but by a distinctive difference in the character of the same—there being an evident loss in the vigour, the solidity, and the distances of the several parts making the picture.

Now, laying aside the camera, let a similar course of experiment be performed with the *eye*, for which nothing more is required to be provided than a series of holes, well blackened, in a thin plate, varying from, say, $\frac{1}{8}$ to $\frac{1}{64}$ of an inch in diameter. Precisely similar effects, perhaps more striking, will be observed by viewing the sunlit landscape with one eye, and using the varied apertures, as in the previous experiments with the camera and its varied diaphragms.

If further proof in the same direction be desired, we have this in both the telescope and the microscope. With the former the moon will afford a striking illustration. In proportion as the aperture of the object glass is reduced by diaphragms, the image assumes a map-like appearance; while, on the contrary, as the aperture is increased, those mountains of our satellite where light and shade prevail stand out in bold relief.

The microscope gives evidence to the same effect. The best object glass of such, sufficiently "stopped down" (or reduced) in aperture, gives sharp outlines, it is true, but the effect (or appearance) of solidity is lost.

Lastly, we have the evidence given by photographs themselves; to illustrate which some are exhibited taken with apertures greater than those in ordinary use. I think it will be admitted that these afford evidence of that which I have undertaken to prove. Doubtless, it would have been still more convincing could I have placed before you photographs of the same view, and taken as nearly as possible under similar circumstances, but with diaphragms of varied apertures; but this I have not had either time or opportunity lately to accomplish.

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* Communicated by the Author; having been read at the last meeting of the Dublin Photographic Society, Friday, March 25, 1859.

ACETIC ACID IN THE POSITIVE SILVER BATH.

Since my last communication on "Positive Printing" (vol. ii., p. 15), I have received several inquiries as to the addition of acetic acid to the silver bath. In answer to these I beg to state that to *each ounce* of the solution I add 8 or 10 drops of acetic acid; but as this is directly against the opinion of some of the highest authorities, can you find space for an attempt at justification?

Firstly, some writers declare that its use causes spots when the print is put into the fixing solution. This may be, if the print is removed from the frame into the hyposulphite without any previous washing; but, if the print first goes through plain water and then is submitted to the ammonia solution, any further action of the acetic acid is certainly prevented; nay, I go further than even this, and say that after common washing the print *never does spot* when fixed, with my method of printing. I never had a print that spotted in the fixing solution out of thousands which I have printed with acetic acid, and as it does not injure the pictures, let me state my reasons for using it.

Many of the hand-books say that it is best to prepare as much printing paper as will be used in one day only, as it discolours if kept longer. If this rule were to be observed what a tedious and expensive process it would be to print a quantity of proofs from one negative. How often does the bright morning suddenly change to a cloudy day, and no light of any power show itself for three or four days! Here we should lose all the paper prepared. But as I stated in my short notice, the printing sheets will keep a week without any loss of brilliancy or whiteness, and this I ascribe chiefly, if not altogether, to the addition of acetic acid. I have been asked many times how I keep the *whites* so pure in my prints, and this also I believe is the effect of the acid.

Again, the crystals sold as pure nitrate of silver are sometimes strongly alkaline; in this case the bath would not be at all suitable for albumenised paper unless some acid were added.

That the acid does not necessarily injure the paper is strongly proved by the acid which is (and *must* be) added to the nitrate solution used in *Positive Printing by Development*. In this process the print is only rinsed and then fixed at once. No spots ever appear in this process, nor in the calotype sheets where a very large quantity of acid is used.

If there is any drawback to the use of this acid, I think it is probable that it makes the printing paper a little less sensitive—perhaps, scarcely perceptible—but this never seems to have occurred to the mind of any of the writers on the subject.

I can only add, in conclusion, that it may seem presumptuous to lift my voice against so many, but my practice and results so flatly contradict these slanders against acetic acid that I still use it, and I am, I believe, as successful as those who have dispensed with its services.

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AN ACCOUNT OF SOME COMPARATIVE EXPERIMENTS BETWEEN THE LENSES OF M. VOIGTLANDER AND PROFESSOR PETZVAL.

Without having the most remote intention of opening our columns to a barren discussion of the differences between M. Voigtlander and Professor Petzval, we could not refuse an invitation to be present at an examination of the merits of their respective lenses, and we propose now to detail the nature of the examination, and the conclusion at which we have arrived.

Two newspapers of the same day and date were pasted on a flat screen, each presenting the same side towards the object glasses of the respective cameras, which were placed side by side in the same plane, and at equal distances (about 2½ feet) from the screen. The lenses were double combination, whole plate, portrait lenses, nominally of the same size (3 inches aperture), but with a slight difference in favour of Professor Petzval.

As the examination was conducted in the absence of Professor Petzval, though not in that of M. Voigtlander, who was present to give any explanations we might happen to require, we may mention that when we commenced our observations, we were wholly unaware which of the lenses was that of the former gentleman and which that of the latter; they were simply distinguished, the one from the other, by being lettered A and B. We may also mention, too, that, not wishing to rely entirely on our own judgment, we were accompanied by a gentleman whom we knew to be entirely free from prejudice in favour of or adverse to either party, and who knew nothing of the questions in dispute between them.

The first test showed that as regarded flatness of field and sharpness of outline, the advantage was decidedly in favour of that marked letter B; and it was only after we had expressed this opinion that we were informed of the fact that this lens was made by Voigtlander; and this also, as we have mentioned above, had the disadvantage of having an effective aperture, the diameter of which was one-tenth larger than that of the Petzval lens.[*]

At our suggestion the latter lens was then taken out and carefully cleaned, and another examination made, which resulted in our coming to the same conclusion as before.

M. Voigtlander then removed the *back* glass from the Petzval combination and substituted in its stead the corresponding one from his own; the result being a marked improvement in the clearness and definition of the print on the ground glass, but still not making the Petzval combination quite equal to the Voigtlander.

The lenses were now taken apart, and the diverging glasses added to the front lens of each combination, with the view of making them orthoscopic; and here M. Voigtlander called our attention to a circumstance, which though it may at first appear trivial, is, nevertheless, of some importance. This circumstance was, the number of screwings and unscrewings (six) requisite in making the alteration in the Petzval lens, whereas in his own combination only two such operations were required, thus lessening, in a great degree, the risk of the lens being temporarily rendered useless by the wear and tear of the screws, or by one of the different operations having been performed erroneously.

The two lenses being now made orthoscopic, and of about thirty inches focus, were attached in succession to a camera, and focussed with the full aperture so as to give the sharpest possible image of two similar newspaper paragraphs pasted on the screen at a distance from each other of fifteen inches; the distance from the object glass being seven feet four inches.

In this test, the superiority of the Voigtlander over the Petzval lens was even more manifest than in the other; not only could the central paragraph be focussed clearer, and more sharply defined, but this clearness and definition extended in nearly the same degree to the paragraph near the margin of the field of view; whereas with the full aperture of the latter lens the central paragraph *could* not be focussed with accuracy, but presented a thick and blurred appearance—in other words, was deficient in sharpness and precision—and that near the edge of the field of vision was so hazy and indistinct that it was impossible to read it. When the central paragraph was focussed as accurately as possible, the distance which the focussing screen had to be moved toward the lens in order to bring the marginal image sharp, was in the Voigtlander lens a quarter of an inch, and in the Petzval lens upwards of half an inch.

These tests, of course, could not be conducted otherwise than with strict impartiality in our presence; and, as to the lenses employed, we believe they are both the property of M. Claudet, in whose room the examination was conducted, and whose honourable reputation we consider to be a sufficient guarantee that these lenses were manufactured by the individuals whose names were engraved on the tube.

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[*] The lenses used were No. 235; maker's name, M. Dietzler: and No. 7,512, maker's name, M. Voigtlander.

We wish it to be distinctly understood that no comparison was instituted between any other lenses than those mentioned. There was no question of the relative merits of these lenses and those of any English maker, but a simple examination as to the superiority of the Petzval lens over the Voigtlander lens, or *vice versâ*.

NEW SOLVENTS FOR CELLULOSE, &c.

BY M. LEON KRAFFT.

For some time past there has been considerable talk in the scientific world of the new solvents of cotton and silk discovered by Dr. Schweitzer, of Zurich. This discovery, as important as unexpected, has already enabled some of our learned academicians to elucidate several hitherto very obscure points in vegetable physiology. M. Barreswil, whose name is so honourably known among photographers, in giving an account of the labours of Dr. Schweitzer, in his *Répertoire de Chimie*, expressed a hope that photography would derive some advantage from these new solvents. It was our opinion, at that time, that such would be the case, and our opinion has been strengthened day by day since then, as the properties of the new substances were more closely examined.

According to Dr. Schweitzer, certain compounds of copper and ammonia possess the property of dissolving cellulose, silk, and other organic substances, almost *instantaneously*. The compound in which he first discovered this property, and which he designated *oxide of cuprammonium*, is obtained by treating the basic hyposulphate of copper with ammonia in excess; an easily crystallisable double hyposulphate of copper and ammonia is the result. The mother-liquor which contains oxide of cuprammonium, is the new solvent of the cellulose. Its preparation occupying some time, M. Schweitzer has replaced it by a green subsulphate of copper in an excess of ammonia.

Recently, also, M. Peligot has still further simplified this process, and at the same time rendered it more economical He fills a glass adapter with copper turnings, and pours on it gradually a certain quantity of solution of ammonia. The liberation of caloric ensues, and a blue liquor is produced.

If cotton be plunged in this solution, it will be seen to change into a thick jelly, which disappears on the addition of a certain quantity of water. To obtain this liquid perfectly limpid, it must be filtered through asbestos, for it perforates a paper filter immediately, which is the same thing as saying that the new re-agent dissolves it. The cellulose can be precipitated by means of alcohol, acids in excess, concentrated solutions of alkaline salts, honey, gum, dextrine, &c. &c. It may even be obtained in amorphous membranous sheets by simple evaporation of the solvent, and these sheets do not adhere to the surfaces on which they are formed.

That which we have said of cotton applies equally to silk, for which Dr. Schweitzer has besides found a special solvent in the ammoniacal oxide of nickel. This re-agent, which exerts no action whatever on cellulose or cotton, does not abandon the silk when mingled with concentrated saline solutions, sugar or gum.

Gun-cotton is insoluble in the two solvents of which we have been speaking.

M. Frémy has shown that ligneous fibres and the pith of trees are completely insoluble in the ammonia-copper solution, and that this insolubility does not arise from the great cohesion of the molecules of the wood, since he has been able to dissolve by its means the substance known in commerce as vegetable ivory, which is so extremely hard that steel cuts it with difficulty. According to M. Payen, the textile fibres of hemp and flax are also soluble in the same re-agent.

Finally, M. Pelouze has contributed his part to these researches. He has ascertained that highly concentrated hydrochloric acid is an excellent solvent for cellulose, and that it dissolves it in a few seconds with great facility. Water forms in this solution a precipitate of striking whiteness, identical with that given by the acids in the ammonia-copper solution of cellulose. He has observed besides that if, instead of immediately adding the water to the acid liquor, a delay of one or two days be allowed to take place, the precipitate will not then be obtained, and that the ligneous matter will have completely disappeared, from having been transformed into glucose.

Hence, then, photography is in possession of several solvents of lignine; consequently of the means of possessing several kinds of collodion, which will, at all events, have the advantage of rendering the use of the costly substances—alcohol and ether—unnecessary. The question to be considered is—How ought they to be prepared?

We will hazard a suggestion of what may be done in this way, which it appears to us might be attempted with success; for example, spread on a glass plate a film of solution of cotton in oxide of cuprammonium, and allow the whole or a greater part of the ammonia to evaporate, then plunge the plate in water slightly acidified with any kind of acid, then wash it in water, and afterwards pour on an aqueous or alcoholic solution of iodide or iodide of potassium; after this has remained on it a few seconds, immerse the plate in the ordinary silver bath, wash, and expose in the camera as usual.

If these operations appear too long, take the solution of cotton in concentrated hydrochloric acid, cover a plate, and let the acid, which is extremely volatile, evaporate, and afterwards plunge it in a nitrate of silver bath, previously rinsing it in water. We shall thus have a film of chloride of silver, a substance we all know to be very sensitive to light, since it is constantly employed in the production of positives.

The last method is exceedingly simple, but it almost involves the necessity of preparing the collodion day by day, inasmuch as hydrochloric acid very speedily transforms the cotton into sugar.

We could easily find other methods of preparing collodion by means of the new solvents we have described; but we do not wish to do more than point out some of the results of recent chemical discoveries which are applicable to photography; it only remains for adepts in that art to render practical and perfect the methods, the novelty and possible advantages of which we have summarily pointed out.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

The normal collodion being obtained, it becomes now a question of rendering it photogenic; and, to accomplish this, it is only necessary to adopt one of the numerous formulæ published; there is no lack of choice. It is not necessary to attach an exclusive importance to either of them. We will merely observe, that with a collodion simply iodised with the iodide of potassium, one may attain perfection with certainty.

In a bottle containing alcohol, say half an ounce for example, dissolve to saturation a mixture in equal parts of iodide of potassium and iodide of cadmium, perfectly dry and finely pulverised. The dissolution will be complete at the end of a few hours; the proof that it is as concentrated as possible will be found in the presence of an excess of undissolved iodide at the bottom of the bottle. This mixture of alcohol and iodides may be made at the same time as the normal collodion, and they will be ready together. Decant the normal collodion and add to it a certain number of drops of iodised alcohol, we will assume not sufficient for the purpose, but this has to be ascertained in the following manner:—Take a glass plate and clean it thoroughly and pour on the collodion; when set immerse it in the bath for one or two minutes; then withdraw it and examine the tint. Seen directly, the film ought to have an *opal bluish* tint; if it be simply *bluish*, the film is not sufficiently odised; if it be *dead white*, it is too much so. In the case supposed it is of a bluish tint, and fresh additions of iodide must be made, in very small quantities, until the collodion has acquired the requisite degree of perfection; when it may be at once used for taking a proof. This proof will not be of any value, inasmuch as it will be covered with black and white specks; but by means of it one may be able to arrive at a correct appreciation of its qualities and the degree of iodisation, which the inspection of the blacks furnishes. This is the real criterion of all collodion. The newly made collodion having been assayed and its qualities tested, nothing more is required than to leave it to finish the different reactions which are necessary to give it its full value, for a time at least, for these reactions, which are at first favourable, eventually deteriorate it.

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* Continued from vol. ii. p. 29.

We have observed that a new collodion gives at first a film covered with black and white specks. These spots are evidently caused by the insoluble particles held in suspension. Filtering would remove the greater portion of these, but this mechanical method of purifying would be too coarse, and we may even say completely illusory, and should never be adopted. These insoluble particles ought to be left to deposit themselves spontaneously; and to accomplish this time is required, and the colour, which is gradually modified, indicates not only the degree of purification of the collodion, but also the progress of the favourable reactions, of which we were just now speaking. Thus the mixture, at first troubled and whiteish, clears by degrees, and becomes slightly yellow; this tint deepens more and more, and at the end of twenty-four hours, or even less, it exactly resembles the colour of olive oil. But that is not sufficient; not only ought the collodion to have acquired this decided tint, but also to be perfectly transparent. For some preparations four days will suffice; for others eight days will not be too many. But when this point is once reached, there is every reason to believe that, the chemical reactions of the mixture being terminated, the collodion may from that time be used with safety.

Besides the deposit due to the fragments of undissolved cotton-powder, and to the impurities which may accidentally exist in the iodides, another may present itself of a mealy and whiteish appearance. This deposit, which ought not to be eliminated, is merely iodide of potassium, precipitated from the alcoholic solution by the ether. After decantation this should be re-dissolved by means of a small quantity of alcohol, and added to the mixture. This deposit only occurs when ether rectified to too high a degree has been used. With such an ether it is quite a chance whether a good preparation is obtained or not. In fact, the rectified ether contracts, on contact with the alcohol, so great an affinity for it that it forces it to abandon a portion of the iodide it held in solution. From which we conclude that the iodides are not at their ease except in a less highly rectified ether: we even doubt whether the resumption of the deposit of iodide by a new quantity of alcohol, may not be an imperfect correction.

(*To be continued.*)

HINTS ON THE COLLODION PROCESS.

BY H. BELLINI.

Having promised to send a receipt for a developing solution which will not fog, or by using which "over development" is avoided, I beg leave to submit the following formulæ to your notice. I have found it useful (for ivory, mica, and talc portraits, for pins, lockets, &c., &c.) when the light was going, or gone, and it was useless for, or a person objected to sit again. In these cases I found a quick and sharp developer, giving good blacks and whites, also most important. Of course there may be others superior for other purposes, or when the certainty of the action of this preparation is not so material.

Background best.—A grey or slate colour.

Light best.—A direct north, if possible; if not, any other found good from experience.

Head light.—If a too powerful bright light strikes on the head, hands, and bust of the sitter, use a light slate-coloured glazed calico head shade; this gives a sort of solidity or relief to the head, &c.

Grouping.—I prefer three-quarter-face, but much depends upon the features of the sitter, light, circumstances, and the artistic taste of the operator.

Collodion best for this purpose is, to my fancy, the American excelsior positive collodion. Try the effect of 30 drops of sulphuric ether and 4 or 5 drops of very concentrated alcohol added to 1 ounce of the above collodion.

Bath best.—60 grains of the best and purest nitrate of silver (in crystals) to every ounce of distilled water. Add ¼ ounce of collodion prepared as above, and 2 drops of nitric acid to every 5 ounces of bath (add the collodion while the bath passes through the filter paper into the gutta percha receptacle). If the bath is too strong, gradually add ¼ ounce of distilled water (trying a plate between each addition) till you get a thick and cream-like film; perhaps you will succeed without adding more water; in summer keep the bath surrounded with cold water, and then this bath will not be too strong; and, besides, you will produce fine pictures. Keep this bath covered from dust and light, whether a plate is on the dipper or not; and you must also count at least 100 tolerably quick after the usual oiliness has disappeared from the plate before it will produce its finest effect.

Use a diaphragm placed close to the front of the lens; thus you obtain an increased amount of sharpness, but slowness of the lens (according to the size of the diaphragm used). I cut mine from thin black gutta percha, or black cardboard, and use also a black gutta percha cap for the lens.

Without extreme cleanliness the best chemicals and instruments are useless; and, therefore, clean the plates well with the following solution, viz.:—

Tripoli	1 ounce.
Water	1 „
Nitric acid	50 drops.

Polish with a very soft leather; after, of course, using a sufficient number of pieces of lint to remove the above mixture. Finally, test the cleanliness of the surface of the plate by breathing upon it; if the breath upon the glass dies rapidly and evenly away, the glass is fit for use. Flatted crown is the best (of the cheap kind) to use.

Nearly all common glass has a slightly concave and convex, as well as a rough and smooth side; the smooth and true side is easily ascertained, by placing it close up to the ear and scratching it with the finger nail.

Focus for the eyes, eyelashes, and shades of the face; thus you obtain the proper expression of a person's features, instead of the caricatures usually exhibited. As the chemical and visual foci do not coincide in certain lenses, the diaphragm partially rectifies this great fault.

Developing solution:—

Water	5 ounce
Nitrate of potash	12 grains.
Protosulphate of iron	2 drachms.
Nitric acid	30 drops.
Glacial acetic acid	½ drachm.

The following added to the above, just before using, is an improvement, viz.:—

Pure alcohol	30 drops.
Nitrate of silver bath (prepared as aforesaid)	15 „

Filter carefully from the bottle it is mixed in into another, then place a second clean piece of filter paper in a measuring glass, and again filter and use as required.

The fixing solution is composed of the smallest possible quantity of white (not yellowish) cyanide of potassium in distilled water; common water and strong fixing, or too much nitrate of potash in a developer, gives as a result a white, flowery, and rough surface; the weak, therefore, is the best. I make my own after this rule in all cases, and neither myself nor pupils have ever found pictures to fade, or the film to have, after a time, a sort of moth-eaten appearance; it ought only to take the white film off after counting fifteen slowly. Pour gently from the spout of a quart jug clean common soft water, at a height of at least 14 inches from the plate, over the film after development and fixing; don't spare the water, nor allow the cyanide to remain on the plate a single second after the half-lights have made their appearance, and particularly wash from the height (14 inches) before directed, commencing gently from the middle of the plate, thus pressing it down, and preventing the film from being washed off. By this means you obtain all the clearness, delicacy, and steely appearance of the daguerreotype process, combined with the certainty of settling the great question of permanency.

Filter the bath, developer, and fixing solution every night after work, or before commencing in the morning, with separate and clean filter papers, the old bath filter paper excepted, which you may use until it is worn out, provided you keep it free from foreign substances, such as iron, cyanide, &c., otherwise you would weaken the bath too much in consequence of the paper absorbing the silver.

The following is a safe, correct, and simple plan to test a good lens, particularly where a person has only a limited knowledge of the laws of optics:—Paste two dozen long black or grey hairs on a strip of cardboard 1 inch apart, comb fashion, and then fix with a couple of pins to a black, grey, or slate background; then take a picture of them on a 5 × 4 plate (commencing from the middle of the plate upwards), noting the degree of distinct sharpness and time of exposure; and, again, another from the middle, downwards, repeating the noting, &c. A lens that will accomplish this distinctly (from the top to the bottom of the plate), and with the same time of exposure, is a good one.

Cautions.—Do not hang white clothes, or keep white paper, or bright tin vessels in the dark room; also beware of the vapours of ammonia, or striking lucifers in the dark room. Pin-holes admit an astonishing amount of light, and are, therefore, deadly enemies to the production of first-class pictures. I have seen so-called dark rooms which admitted more daylight than many glass houses could boast of. One in particular belonged to a pupil of the celebrated Mr. A——, in which was a large room window, a partition with a door to it having been put up at the end of what was once an old lumber room, but possessing capital side and head lights; this room window he had merely covered over with a single thin piece of pale yellow tissue paper, and the walls were white-washed; in fact, he almost developed by daylight, so you may guess he did not produce very good pictures. Well, he fancied his camera admitted light, that the glasses had been displaced, his collodion or the developer bad, and, finally, that some friend (?) had good-naturedly "queered" his bath. These I tested at my own place, and found that I could produce better pictures than he had done with his own tools. I then took my favourite chemicals and instrument, but succeeded no better than he had done. Now I knew that the fault lay in the dark room: I advised him to have a pane of yellow glass inserted in the middle of the bottom of the window, and the rest covered over with black paper, the walls also covered with ditto, and the holes stopped up; this done, we both met with success.

PRESERVATION OF SENSITIVE PAPERS, AND NEW PROCESS OF NEGATIVE PHOTOGRAPHY.

BY M. GAUMÉ.

The last number of the *Bulletin* has induced me to think that many of the members of the Society would, perhaps, feel an interest in knowing the method I employ for preserving my nitrated papers during several weeks without alteration; and, consequently, as available for use as if they had been prepared the previous evening. However, I cannot say if they would remain thus for an indefinite period, not having tried them for a greater length of time than three weeks.

After having nitrated the paper, allowed it to drain, and dried it thoroughly at the fire, I enclose it in a box lined in the interior with plates of plaster of Paris, loosely tempered, and thoroughly dried either in an oven, or on a stove. These plates which may be easily removed, dried from time to time, so as to deprive them of the humidity which they absorb in the atmosphere; the prepared sheets of paper placed in this box ought not to be pressed one against the other, but rather placed edgeways in such a manner that the air between them should remain dry; these plaster plates being very hygrometric, and of a certain thickness, the internal air of the box, which should be well-closed, remains perfectly dry; and, according to MM. Davanne and Girard, the papers ought to be preserved in this state for an indefinite period.

In sending to the Society my positive paper process, *à la gutta*, I announced that I had a negative process which it appeared to me ought to be preferable to those employed hitherto. The essays which I, as well as my friend M. Boivin, who is known to you by his dry collodion process, have made, convinced me that I was not deceived. For after three weeks' preparation with the aceto-nitrate, these sheets gave proofs as good as those of the first day, and were as sensitive as the glass plates by my process on glass.

The sheets are prepared precisely like my positive paper, only, instead of chloride of sodium, I put from 2 to 3 per cent. of iodide of ammonium, and one of bromide in the albumen, and dry it at the fire. I expose in the camera on ground glass, and develop with gallic acid strengthened with some drops of aceto-nitrate.

I fix with hyposulphite at 50 per cent., and wash as with positive proofs.

To sensitise I entirely immerse the sheet in the ordinary aceto-nitrate, then wash it three or four times in rain water, and dry it at the fire. After this operation, if I fear resinification of the gutta, I plunge the proof, for a few seconds, in benzol, which removes the greater part of the gutta, and I wax the proof, as heretofore, if it is very strong, or leave it semi-transparent if it is weak, and I desire to have a vigorous proof.—*Bulletin de la Société Française de Photographie.*

STEREOGRAMS FROM FLAT SURFACES.

In the latter part of last year, an ingenious device for the purpose of obtaining pictures from flat surfaces, suited for stereoscopic purposes, was made known to the world by Mr. Sang. At the first appearance of the thing some of our contemporaries were very much carried away with the idea, and committed gross blunders in the appreciation and estimation of the discovery; while others, who had hit upon the method of producing these results, were unusually severe in their exposure, we might almost say condemnation, of it. That the invention is clever, there can be no denying; and when we first noticed it we remarked that—"we must give to Mr. Sang full credit for the great ingenuity he has shown in thus bringing (however imperfectly) the world of the painter and engraver into the domain of the stereoscope." Since the announcement of Mr. Sang's device, we were not aware that any one has attempted to produce stereograms from flat surfaces. We have, however, lately been favoured with a specimen by Mr. George A. Dean, of Douglas, Isle of Man. The subject which he has chosen for illustration is a most difficult one, and he certainly has succeeded in giving the stereoscopic effect very well. It is one of the cartoons from our facetious contemporary, *Punch*, entitled "The French Porcupine," wherein is represented his imperial majesty the Emperor of the French as a porcupine, his bristles consisting of bayonets—the motto under which is—"He may be an inoffensive animal, but he don't look like it." Now our readers will be enabled to form some idea of the difficulties with which Mr. Dean has had to contend, in retaining the sharpness of the bristles—or bayonets. The specimen is very good, although not quite so successful as those which Mr. Sang has produced.

Lessons on Colouring Photographs.

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COLOURING IN OIL—(*continued*).

Second Painting—(*continued*).—The distant scenery in the landscape background may be painted with the same tints, a little modified, as the sky. The sky line, or point where the landscape and sky meet at the horizon, must be sufficiently well marked, without being hard. The sky tints, modified with deeper greys, will serve for the distance, the forms as well as colours being vaguely defined—for clearness, and sharpness of form and definition, as well as brightness of colour, are lost in the distance. It is no part of our object in these lessons to give instruction in drawing; and, unless the colourist has some knowledge of drawing, it will be very unwise to attempt to paint a landscape background: all we need say on this part of the subject is, to repeat what we have already observed—that all objects in a background should be subservient to the principal figure, and should be quiet and unobtrusive in colour and form. In painting the middle distance and foreground of the landscape, therefore, whilst using brighter tints and sharper definition, the idea of atmosphere and distance must still be preserved, even in the most advancing parts.

The draperies in a good photograph have already the form of fold, and the texture of material so admirably rendered by light and shadow, that it is rarely necessary to make any alteration in these respects—colour is all we have to add. The following tints, for various colours of silks and satins, will be found useful; they must be modified in some cases to suit the tone of the photograph:—

For white silk or satin:—The lights, white; middle tints, white, black, and sometimes a little Indian red; reflects, white, French blue, and brown ochre; shadows, black, white, and Indian red.

Blue silk or satin will require either white and French blue, or white and Prussian blue, for the lights, depending on the tint required; middle tint, the same, with more blue; reflects, brown ochre added to the above; shadows, ivory black, Prussian blue, a little white, and sometimes a little vermilion.

Red silk or satin will require the following tints, modified as the red may approximate to scarlet or crimson:—For lights, yellow ochre, light red, and white; middle tint, Indian red, crimson lake, and vermilion; reflects, vermilion and light red or carmine, and yellow; shadows, Indian red, lake, vermilion, and a little ivory black.

Yellow silk or satin:—King's yellow and white for the lights; middle tint, yellow ochre, brown ochre, white, and a little black; reflects, yellow ochre and light red; shadows, brown pink and burnt umber.

Green silk or satin:—Lights, Prussian blue, King's yellow, and brown pink, or emerald green and white; middle tint, Prussian blue, brown pink, and King's yellow; reflects, Prussian blue and brown pink, and sometimes a little lake; shadows, the same, with more Prussian blue.

Black silk or satin:—Lights, light red and a little white; middle tint, lake, white, and ivory black; reflects, lake and black, and sometimes a little brown ochre or brown pink; shadows, lake and ivory black.

Cloth fabrics will often require the same tints, differently combined, and painted with less brilliancy. Black cloth will first have the shadows strengthened by glazing with lake, Vandyke brown, and black, and the lights then painted with a mixture of black and white.

White linen will require the same tints as white satin, but less brilliant; sometimes the whites of the photograph, with very slight modifications, may be left as they are.

Gold ornaments may be painted with yellow ochre, or yellow ochre and raw umber; the shadows, burnt sienna and raw umber; and lights, Naples yellow.

In the second painting, the work should be sufficiently brought forward to have a tolerably finished effect. In portions of the picture requiring softness and blending of tints, the badger-hair softener may be used cautiously. This will also reduce the surface to a level, and remove the marks of the brush where the handling is too bold or abrupt; but care must be used not to produce a woolly effect.

In this painting, the colours must be kept pure and brilliant, as it is easy to soften them afterwards; and some allowance must be made also for the subduing and toning effect of time.

The second painting concluded, again carefully put the picture in a place free from dust to dry.

(*To be continued.*)

Dictionary of Photography.

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Carbonate of Ammonia, of commerce, or *sal volatile*, is, strictly speaking, the sesquicarbonate, containing two equivalents of ammonia and three of carbonic acid. It is usually met with in the form of a transparent fibrous mass, which is soluble in about three parts of cold water. Exposed to the air at the ordinary temperature, it loses its ammoniacal odour, and crumbles down to a soft white powder, which is a bicarbonate, consisting of one part of ammonia and two parts carbonic acid. The same salt is produced when a warm saturated solution of the commercial sesquicarbonate is allowed to crystallise; neutral carbonate of ammonia remains in solution, and regular crystals are deposited, which are inodorous, and quite permanent in the air.

Carbonate of Baryta. In the native state this forms the mineral *witherite*: it may be artificially prepared by adding carbonate of ammonia or of soda to a solution of chloride of barium. It forms a heavy white powder insoluble, or nearly so, in water. It is very useful in separating sulphuric acid from a solution, which it does readily if mixed up with it, on account of the great affinity existing between these two bodies, and the total insolubility of sulphate of baryta. The reaction consists in the substitution of sulphuric acid for carbonic acid, as shown in the following equation:—$BaO.\ CO_2 + SO_3 = BaO.\ SO_3 + CO_2$. The carbonic acid being evolved with effervescence, nothing remains but the sulphate and excess of carbonate of baryta, which can be removed by filtration.

Carbonate of Lead. *White lead* of commerce is a soft white powder, of great specific gravity, insoluble in water, but soluble in dilute nitric or acetic acids. It is prepared to an immense extent for the use of painters, by the reaction of carbonic acid produced by fermentation upon metallic lead in the presence of a small quantity of vinegar.

White lead is a valuable paint, on account of what is technically called the great *body* which it possesses; it is, however, liable to the serious drawback of turning black if exposed to the air, owing to its ready absorption of the sulphuretted vapours which are always floating about in the atmosphere, especially near large towns, black sulphide of lead being produced. For this reason preference should always be given to a recently introduced substitute—*zinc white*, which consists of oxide of zinc. Many beautifully coloured portraits have been from time to time brought under our notice, which have been entirely destroyed from this cause. Carbonate of lead is also used for glazing visiting and other cards, and, in this form, has been made subservient to the requirements of the photographer, by acting as a support for collodion pictures.

Carbonate of Lime is a body largely met with in nature as chalk, limestone, marble, Iceland spar, &c. It may be artificially formed in the same way as carbonate of baryta, by adding a soluble carbonate to a soluble lime salt; it forms a soft, white powder, which has been used by Maxwell Lyte for removing sulphuric acid from its solution in the preparation of metagelatine. Sulphate of lime being, however, slightly soluble in water, carbonate of baryta should be employed by preference. Carbonate of lime is also of frequent use in neutralising acids in solutions where the presence of a soluble lime salt is immaterial.

Carbonate of Magnesia. *Magnesia alba* is the compound which is known in commerce under this name, although, chemically speaking, it is a mixture of neutral carbonate of magnesia with magnesia and water. It is prepared by precipitating a solution of sulphate of magnesia with a soluble carbonate; boiling for a few minutes, and then filtering and washing the precipitate. In photography the carbonate of magnesia is sometimes used to prepare nitrate of magnesia, one of the first substances employed for preserving the sensitiveness of collodion plates.

(*To be continued.*)

A Catechism of Photography.

THE TONING BATH (*continued*).

Q. What other formulæ beside those already named are used in the toning of photographs?

A. In place of the simple chloride of gold the following solution is sometimes employed:—

Water	1000 parts.
Chloride of gold	1 „
Hydrochloric acid	10 „

This solution is exceedingly rapid in action, and is particularly useful in restoring proofs which have turned almost black.

Q. What other methods are employed?

A. M. de Caranza proposes the chloride of platinum as a substitute for the chloride of gold. The effects produced by this process are very good.

Q. How is the process conducted?

A. As soon as the proof has been sufficiently developed, the high lights assuming a violet tint, the impression is taken from the frame and plunged into a basin containing the following solution:—

Distilled water	2000 parts.
Chloride of platinum (as a syrup) ...	1 „
Hydrochloric acid	30 „

After an immersion of a few seconds the proof changes its tone to a bluish grey, the high lights and deep shadows being beautifully developed in black and white, while the half-tones are well preserved. As soon as this is accomplished the proof should be removed from the platina bath and well washed in five or six waters; it is subsequently transferred to a solution of milk of lime, and, finally, plunged into a bath of hyposulphite of soda, which has the effect of giving depth to the blacks, a rose tint to the half-lights, and preserving the brilliancy of the bright lights. A quarter of an hour is amply sufficient to fix a proof by this process; and it is found to be very successful.

Q. Describe some other process.

A. Photographic positives are sometimes fixed and toned by employing the sel d'or, besides which there is another process which has the effect of giving the proof a brown-red tone, almost approaching that of carmine. The proofs, in this instance, are immersed in a bath of water, to which is added a few drops of the saturated solution of bichloride of mercury.

Q. Does not the process adopted by M. de Molard and some other French photographers differ from any of the formulæ to which allusion has already been made?

A. It does. The process of M. de Molard is exceedingly rapid in action, and is very successful. The proofs are fixed by a solution of ammonia, in the proportion of one part to five parts of water; after being thoroughly washed, the proof is placed in a bath of pure water, to which is added a few drops of the solution of the *cyanure iodeux*.

Q. What is the *cyanure iodeux?*

A. This liquid is so called by M. de Molard, and is a mixture of the iodide of potassium and the iodide of cyanogen. In 10 grammes of distilled water is dissolved one gramme of cyanide of potassium; to this is added iodine, and the solution is shaken until it assumes a violet tint. The action on the proof is very rapid; while in the ammoniacal bath it is red, but quickly changes its tone to brown, bistre, black, blue-grey, and would be completely effaced if the action was not stopped. It must be removed from the bath the moment the required tone is obtained, and briskly washed in pure water.

Q. Are any other methods used in toning positive proofs?

A. Yes, numerous other methods are employed, and all are more or less varied according to the taste of the operator, the toning bath being chiefly remarkable for the artistic effect which it imparts to the proofs, and according to the colour or intensity required is the bath regulated.

WASHING.

Q. Why is so much stress laid on washing in detailing the various processes used in toning positive photographs.

A. Because so much depends on the perfect washing of the photograph both after fixing and toning; and a failure in this particular destroys results otherwise the most perfect.

Q. Is it necessary to wash the proof after immersion in the hyposulphite bath?

A. Yes, this is most essential; for if hyposulphite of soda, even in the smallest quantity, be allowed to remain, it causes the picture to fade. After the process of toning it is necessary also to wash the proof thoroughly; otherwise certain chemical agents are allowed to remain on the proof, decomposition takes place, and the whole labour of the operator is defeated.

Q. Is not hot water sometimes used for washing positive proofs?

A. It is; the chief advantage being that the action is more rapid than when cold water is employed.

Q. Is not running water recommended?

A. Yes, and it is desirable to use it when practicable. In either case the greatest care must be taken that all the proofs are thoroughly saturated with water; that the stream be continued till it runs off from the proof perfectly clear; and that when immersion is used, the proofs be removed, and fresh water renewed until no fresh solution takes place, and the water in which the proofs are laid remains unchanged.

Correspondence.

THE WET *versus* THE DRY PROCESS.

To the Editor of "The Photographic News."

Mr. Editor,—The communication in vol. ii. p. 9 of the "News" from Mr. A. Mactear, of Glasgow, was one which, I have no doubt, would be read with interest by a great many of your readers. I have often regretted that notes of photographic tours were not more frequently published in the journals, for, judging by the few that have occasionally made their appearance, what a fund of amusement and instruction would thus be elicited, when we consider that every summer hundreds, and perhaps thousands, of enthusiastic amateurs are ransacking every nook and corner of our pleasant island for the beautiful and the grand! By such a correspondence, not only would the relative merits of the wet and dry processes be discussed, and the sources of failure sometimes attending the latter be made known, but the most interesting spots, as well as what architectural subjects are "photographically possible" could be pointed out, thus, in some measure, supplying the desideratum mentioned in vol. ii., p. 11, by "W. W." With a view to assist in establishing such a correspondence, and also to reply to Mr. Mactear's conclusion respecting the dry process of Mr. Fothergill, I send you a few particulars of a week's ramble with the camera among the English lakes.

I had for some time practised the collodio-albumen process, occasionally getting a good negative, that is free from blisters, but those horrid "sores" began so fearfully to increase, spoiling almost every plate, that I abandoned it with little regret as soon as Mr. Fothergill showed us a "more excellent way." My second plate with the new process, like Mr. Mactear's, was so beautiful, that I at once determined to prepare a quantity and start on my destined journey. But here I differed from Mr. M. in the preliminary preparations. Instead of a deal, I had a well-seasoned mahogany box constructed, the grooves and inside of which were twice coated with shell-lac varnish; hence the difference of results, as the sequel will show. I should scarcely have thought, Mr. Editor, that a "practical" photographer would have put *prepared* plates in a common deal box; much less should I have expected him to abandon a good process, simply because such a piece of carelessness had once spoiled his pictures. Having got ready about 4 dozen 10 × 8 plates, and sufficient developer for 3 or 4 to ascertain the proper exposure, and having been bitterly disappointed that a friend who had contemplated going with me could *not* go, I started alone with my precious charge at 10 o'clock p.m., the 21st of last June. The rain began to pour down in torrents as soon as I entered the railway carriage, which was anything but a pleasing omen for one in my situation. However, before reaching Leeds (which I did at 3 o'clock in the morning), it had cleared away, and the unclouded rising of the sun gave promise of a fine day, and dispelled my gloomy fears. As I had to stay in Leeds until 6 o'clock, and, not liking the appearance of the cold waiting room, I wandered forth into the town to wile away the time. There are few objects in that smoky place to interest the traveller; but the new Town Hall is a fine building, and I soon found myself selecting the best spot for a view of it. Having satisfied myself that one might be obtained, I contemplated taking one on my return. But it soon occurred to me that the atmosphere would not admit of it when the factory fires were lighted, so I went back to the station, got the porter to carry up my camera, and fired away plate No. 1. The clock struck five as I replaced the cap which brought home the fact that it was rather an early hour to be taking photographs. As we went whirling past Kirkstall Abbey I (photographer-like) was painfully sensible of the inconvenience of railways, not allowing one, even with a camera, to loiter on the road. Arrived at Lancaster, 9.30, my resting place for the day. I saw nothing particularly striking in that venerable place, but a splendid view was obtained from the churchyard joining the castle. The day being very clear and bright, I exposed two plates of a distant view overlooking the valley of the Lune. Here, too, I obtained the first glimpse of the blue mountains which formed the scene of my destination. I arrived at Windermere station at 8 p.m., and never shall I forget my first view of "wooded Winandermere, the river lake," calm as a mirror below me, surrounded by its "fells" and mountains, then steeped in the gold and purple hues of sunset. As I was riding down to Bowness, I fell in with a professional photographer of that place, who kindly, at my request, granted me the use of his dark room to develop my exposed plates. My anxiety to see whether my journey was likely to prove a failure was great; so having ordered supper and a bed, I proceeded to Mr. F——'s, and judge of my satisfaction and delight as I returned to my lodgings with two perfect and beautiful negatives of the scene that had just charmed me at Lancaster. Three things contributed to make me sleep soundly that night, viz., not having slept any the night before, the prospect of fine weather, and the probability that my plates would turn out successful. I arose in high spirits the next morning, and having engaged a man and boat, proceeded to canvass the shores of Windermere. The views from Rayrigg Bank were splendid, as nearly the whole length of the lake, studded with its numerous islands, can be seen from that eminence. I exposed several plates here, then rowed to "Lowwood Inn," crossed over to Wray Castle, on the opposite shore, and, in returning, landed on Belle Isle, from which a beautiful view of Bowness is obtained. My transferring box (one of Ottewill's) held twelve plates, which were now exhausted; so I returned to my lodgings, well tired with my day's work. I could not, however, resist the temptation of developing another plate or two, which, as the result proved, I had much better let alone. On bringing the negative out to the light, I was mortified to find that, while it had developed beautifully, it was utterly spoiled by a multitude of minute pin-holes covering every part of the plate. For some time I was at a loss to account for such a strange appearance, but at length found out my enemy. On examining the small quantity of silver solution I had brought with me, I found it full of small floating particles, which at once solved the mystery. It had been mixed some time, and I had not examined it before leaving home; thus showing the necessity of attending to the smallest particulars in conducting the different operations. My next day's ramble was to Ambleside, Rydal, and Grasmere. At the former place, Stock Ghyll Force is usually considered the chief object of attraction; but I was so much disappointed in it, that I did not think it worth a plate. Everything at Rydal, of course, is sacred, being honoured as the residence, and immortalised by the sonnets, of Wordsworth. The lake, and the upper and lower falls, Rydal Park, afford pleasing pictures. There is an admirable view from the grassy mound in front of the poet's house, but too distant to be photographed with effect. A few minutes' walk after quitting Rydal brought us to the beautiful and quiet vale of Grasmere. In the centre stands a little church, the resting-place of Wordsworth. Of this sweet spot, well might Mrs. Hemans sing—

"O vale and lake, within your mountain urn,
Smiling so tranquilly, and set so deep:
Oft doth your dreamy loveliness return.
Colouring the tender shadows of my sleep
With light elysian;———"

Many interesting views of this "vale and lake" may be obtained from the eminences round, but perhaps, when the day is clear, the best is that from Red Bank; the haziness of the atmosphere, however, prevented me from taking it. Crossing Red Bank and returning to Ambleside by the Clappersgate-road, I planted the camera to take a view of the former place, with Wansfel in the background. While doing so, a number of lads, returning from school, planted themselves right in front of the lens, their object being announced in the words—"Mester, will you draw my likeness?" I proceeded as if to comply, placing them just *outside* the field of view, and giving strict injunctions that unless they remained perfectly still until I told them to move, their "likenesses" could not be "drawn." This plan of dealing with such intruders, I am inclined to think, is superior to the "silver sixpence" one of your Glasgow correspondent. Six o'clock next morning found me seated outside the coach bound for Keswick. Hundreds of splendid views we passed on the road, and more than once did I feel inclined to abandon my seat, and linger behind to record on the sensitive tablet some points of the lovely scenery through which we were passing. Especially was this the case as we wound by the long, narrow lake of Thirlmere. So smooth was the water, that the woody eminences surrounding it, bathed in sunshine, were reflected as perfectly as in a mirror. On arriving at Keswick, the morning, which had hitherto been so bright and clear, began to get hazy, shutting out completely the mountains from the background of my pictures. I spent the day in taking a few views round Derwentwater, returning to Bowness at night. Determining next day to be more independent of circumstances, I hired a car, and having secured the services of a native, proceeded over the heights of Troutbeck, and through Kirkstone Pass to Ullswater. As I contemplated ascending "the brow of the mighty Helvellyn," I had only time to photograph a few of the sublime views which that splendid lake presents. If I ever felt tired in my life it was that night, as I tumbled, half-asleep, into bed, having since I rose in the morning ascended a mountain, taken a number of photographs, and ridden thirty miles.

Next morning I bade farewell to that region of beauty, and started on my homeward journey. Never did I feel so reluctant to leave a spot which in so short a time had made an impression on my memory (and as I then hoped on my plates also) never to be erased. On arriving at the station, I found, to my extreme mortification, that my dark box was left behind. This detained me two hours. At Carnforth junction I could not resist the temptation (as I had not quite exhausted my stock of plates) of turning aside to Furness Abbey. The day was very dull and windy, and gave signs of approaching rain; however, my work was done, so I did not now fear it. Shortly after midnight I found myself once more in my own bedroom, never better prepared for the influence of "tired nature's sweet restorer—balmy sleep," a fact you would not dispute were I to tell you what time I arose next day. I had now, shall I call it the pleasantest, at least, the most satisfactory business of the excursion to undertake—viz., the development of my pictures. And here I would ask the advocates of the *wet process* if they have any conception of the feelings of a genuine photographer, returned from a long ramble amidst some of nature's most beauteous scenes, as by his own fireside, and at his leisure, he sits down and sees gradually appearing on the wonderful tablet, as if by magic, a faithful representation of the charming views, now far away, on which his eye had lingered, and finds that the anticipations he had so fondly indulged while on his pleasurable, not troublesome tour, were not doomed to disappointment, but destined to be realised? Such, Mr. Editor, I am happy to say, was my good fortune. As one after another of my plates were developed, I seemed to travel my journey over again—so vividly did I see in the miniature what had so charmed me in the original. Forty-one was the number of plates exposed; of these four or five were spoiled by the wind shaking the camera, two or three (of shaded waterfalls) from insufficient exposure; the rest (with the exception of a scarcely injurious defect in a few, occasioned by putting the plates in the dark box while wet, after their preparation) were perfect negatives. The one of Leeds Town Hall, taken first and developed last (three weeks intervening), was among the best.

Such were the results of my excursion. Now for the conclusions. First of all, let me observe, that while I had every reason to be satisfied with my success, I learned a lesson or two which I shall remember in future,—viz., not to attempt to take too many pictures in a given time, but pay more regard to the selection of the choicest spots, and the most favourable points of view; again, not to throw plates away on a windy day, and, lastly, always to keep the box containing the plates in your own possession while travelling. In conclusion, may I not, sir, reasonably ask, seeing that such results as these may be obtained, and with ordinary care absolutely depended on, by the *dry* process, when you may prepare any number of plates before leaving home, and after a fortnight's or even a month's absence, develop *there* as many successful pictures, when with your lens slung o'er your shoulder, and tripod in hand, the only apparatus required is a light folding camera and the plate box—I say, may I not reasonably ask, what is the use of all the cumbersome, troublesome, intricate bulk of material which the wet operator has to transport from one view to another? Away, then, with "dark tents," "photographic barrows," "developing cameras," "packing cases," "water bottles," "travelling baths," dishes, bottles, chemicals, weights, measures, with all their packing, unpacking, and tying down, the pouring in and pouring out, "cloths," "wash leathers," cleansing mixture, dust, rolling perspiration, suffocating odours, hotel stained tables and carpets, with all the *wasted time*, and other pleasing reminiscences of a wet collodion campaign.

If I have trespassed too far on your valuable space, deal with me as seemeth good to yourself; content to be your humble servant,

Multum in Parvo.

Nottingham.

Photographic Societies.

Blackheath Photographic Society.

At an ordinary meeting of the Society, held on the 21st March, 1859, at Mr. Wheeler's, No. 10, The Grove, Blackheath; the President, J. Glaisher, Esq., F.R.S., in the chair,

The minutes of the last meeting were read and confirmed.

The President announced the perfect success of his conference with the Right Honourable the Lord Mayor, and had the pleasure of communicating his lordship's acquiescence in reference to holding a Photographic *Soirée*, in connection with this Society, at the Mansion House, on the 15th proximo.

It was moved and seconded, that the Committee originally designated be re-appointed, viz., the President, Treasurer, and Secretaries *ex officio*, Messrs. Bennock, Heisch, and Wood.

Messrs. Stuart Knill and H. Williams were appointed Auditors for the ensuing year.

The President then proceeded to read a paper "On the Application of Photography to investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich."

The author commenced by stating, that the subject resolved itself into two divisions, viz., the purposes to which photography was applied, and, secondly, the method of application; and, he observed, that it was necessary to consider, in some little detail, the first part of the question, that the full value of the application of photography should be understood; and he purposed to confine himself, on that occasion, to the subjects of investigation, reserving the consideration of the mode of application for another evening.

The subjects of investigation are those elements in terrestrial magnetism and meteorology which it is considered most important at present to pursue. First, speaking of magnetism, he said, if a bar of iron be suspended by a few fibres of silk by its centre, it will be horizontal, and will settle in any position; but if the bar be made magnetic, it will at once pass to a definite position, and one end will be inclined downwards. This direction of the magnetic force, he said, undergoes every possible change at the different parts of the earth's surface; and, for the purpose of determining and representing the direction, is referred to two planes—the one horizontal, the other vertical.

If a magnet be suspended horizontally by a few fibres of untwisted silk, it will rest in the magnetic meridian; and the angular distance between this position and the true meridian, is called the variation or declination. The other plane of reference is a horizontal line, the angular distance between which and the inclined position of a magnet, when suspended freely, is called the dip.

In the practice of the observatory, the variations of the dip are made by investigations in the horizontal and vertical components. The variations of the three elements, viz., the declination, the horizontal force, and the vertical force, of the dip, are the subjects of photographic application; and, when it is considered, that if the most minute spider should unfortunately gain access to the boxes containing the magnets, and attach one line of his web to the end of the magnet, that all freedom of motion is destroyed, it is evident that it can be but by some imponderable agent alone that such minute and delicate movements can be registered; and this service is satisfactorily performed by the means of photography.

The author then briefly referred to some application of such investigation. He said the mode of operation was as follows:—Taking the declination as an instance when any portion of the globe was sufficiently rich in results, they were laid down in proper positions on a map, and then, with a free hand, and good judgment, isophœnomenal lines were drawn. A map, thus prepared, by —. Evans, Esq., was exhibited, showing the lines of equal declination, as far as is now known, over the world.

A vote of thanks was then unanimously tendered to Mr. Glaisher for his interesting paper, and a hope expressed that he would resume the subject at a subsequent meeting of the Society.

W. Nelson Smith, Esq., was elected a member, and the following gentlemen proposed for future election, viz., Robert Obbard, David Harding, and Andrew Itter, Esqrs.

The meeting then adjourned.

Photographic Notes and Queries.

◆

M. NIÈPCE'S "NEW ACTION OF LIGHT."

Sir,—As my name has been mentioned more than once in your journal, in connection with M. Niépce's researches "On a New Action of Light," may I beg of you to favour me by giving insertion to the following remarks. This subject excited the greatest interest at the time of its first announcement, and if the various attempts which have been made to repeat the experiment had been successful, we should not, as Englishmen, have been backward in giving all honour to the distinguished foreigner who first noticed so remarkable a phenomenon.

The impression on my own mind, when reading the original paper, was, that the effects described were considered to be due to a property possessed by certain bodies of absorbing or storing up the actinic force, and of re-radiating the same in total darkness. I, therefore, took some pure forms of bleached cellulose—such as Swedish filtering paper, cotton-wool, &c., and exposed them to the light for about six hours, during a portion of which time the sun was shining brightly. They were then removed to a dark room and laid closely in contact with sensitive albumenised paper; but at the expiration of twenty-four hours no darkening had taken place. I should mention that the sensitive paper was purposely made very dry before the experiment began, in order to be secure against any accidental reduction of silver by organic matter, which the presence of a little moisture might have favoured.

In a second experiment, white filtering paper was soaked in a strong aqueous solution of tartaric acid, dried, and exposed to the sun. It was then compressed in a printing frame with sensitive albumenised paper as before, but no effect was visible, even after a week's keeping.

Afterwards, a piece of glass, covered with white paper and carefully insolated, was taken into a dark room and left for about six hours, nearly in contact with a dry collodion plate, the two being separated by a stratum of air of about the thickness of a sheet of mica. On applying to the film a developer of mixed pyrogallic acid and nitrate of silver, it remained clear, and showed no signs of reduction.

The experiment with the sealed tube which, you, sir, have so conclusively shown to be quite possible, even without the aid of light, I did not myself repeat, having become satisfied, from the results above detailed, that the conclusions of M. Niépce were not altogether legitimate, and that much remained to be done before these remarkable phenomena could be classified, or the conditions upon which they depend for their success exactly described. F. Hardwich.

King's College, March 30th.

IMPROVED PLATE BOX.

Sir,—Permit me to inform "Euphos" that his improved plate box, as described in vol. ii., p. 22, is on precisely the same principle as Archer's, only by no means so cleverly worked out. The carriers, or frames, should be $\frac{3}{16}$ths of an inch thick, and hinged together at one end, so as to open like the leaves of a book. Silver wire should not be used at the corners, but a thin slip of mahogany let in. Eight frames will be only an inch and a half in thickness, and will carry eight plates, which are quite enough for one day's work, and more than enough for most days. Six plates are sufficient to take out if the wet process is employed, and the getting six good negatives will be a capital day's work. On Saturday (19th inst.) I managed to obtain half a dozen negatives, but in doing so I occupied five hours, although I did not move my dark chamber from the spot where I had erected it. I might have got two more had it not been for the smoke from the seaport town I wished to take, and a haze which pervaded the distance, although the day was otherwise very fine. To obtain certain effects of light, one has frequently to wait a long time; but the trouble and difficulty of working with wet collodion out of doors are such as few persons would believe, and the inconveniences and annoyances very great. I intend to give it up for a good dry process, such as the collodio-albumen. With Fothergill's process I have never been able to obtain a moderately good negative.

Let me advise all photographers, who have leisure and opportunity, to take as many negatives as they can in March and April. There are no better months in the year, and the present month has been a remarkably fine one for photographic excursions. I have been all round the coast of Kent, and am now on that of South Devon, where there are somp charming things, if people will only take the trouble to fine them out. I mention this, as in a recent account of a photographic tour in this district, the writer, after spending one day here, passed on with the remark that there was nothing to detain a photographer longer. Now, after being here a fortnight, I think I could well remain another with advantage, and that even a month longer would afford me quite enough work to do. An Amateur.

PORTABLE STAND FOR A DEVELOPING BOX.

Sir,—I was three weeks ago placed in similar circumstances to your correspondent P. F. P., and I have succeeded in overcoming my difficulty to my entire satisfaction. I sent for a very intelligent workman, and we concocted together a developing box stand, for which he charged me twelve shillings, which has answered my purpose admirably, being very steady, strong, and light, and fits into my developing box which is inside; measurement, 1ft. 10½ in. × 1 ft. 4½ in. × 1 ft. 3 in., and contains all my field apparatus for my full plate and stereoscopic cameras.

The stand is made of beech, and is of the most simple construction; the legs have no centre joint in them, but the height is gained in the top block, which is hollowed out so as to make it as light as possible without deteriorating from its strength and firmness. The developing box, when on the stand, is two feet high, which I found a good working height for a man 5 ft. 8 in.; but without increasing the length of the legs, or weight of the stand, it might be made of mahogany in place of beech, and two inches higher in the block. P. R. Innes.

QUERIES ON THE NITRATE BATH.

Sir,—The other day when using a bath which had been put away for some time it produced the following result:—

On dipping the coated plate in the silver solution, the film of iodide of silver formed perfectly and then dissolved. I then added some iodide to the bath, thinking that it might be deficient, but, on trying the bath, found the same result. I then added 2 ounces of distilled water to the bath (6 ounces) filtered, and then added 100 grains of nitrate of silver; tried a plate, but with no better success.

The bath gave an acid reaction, and I neutralised it with carbonate of soda: still the same result. I then acidified it with nitric acid and tried again, but found it no better. As a last resort, I precipitated the whole of the silver in the form of a carbonate, and then reduced it with nitric acid; after saturating with iodide, testing, and finding the bath in an acid condition, I again tried a plate, but still with the same result.

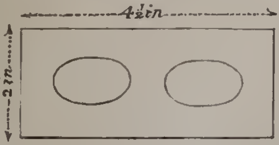
Can you inform me the cause of the peculiar action of the bath? I have named the circumstance to several photographers, but they have not met with a similar difficulty.

P.

[We are quite at a loss to suggest a reason for the above. The effect is quite at variance with our own experience on the subject and also with theory. Perhaps some of our correspondents have met with a somewhat similar result; if so, will they favour us with their experience? So strange and abnormal a condition of the bath deserves investigation.—Ed.]

A STEREOSCOPE WITHOUT LENSES.

Sir,—Make a box of cardboard, or thin wood, 6 inches long, 4½ inches wide, and 2 inches deep. In one end of this cut two holes to serve as eye-pieces; if these holes are long instead of round, they will be better adapted for various eyes, thus:—

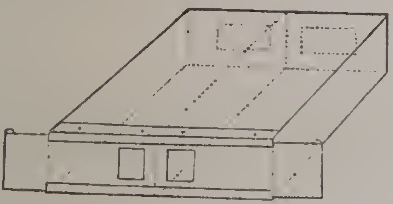


or, if it is preferred, two short tubes may be inserted in slides, as in some stereoscopes, so as to admit of adjustment. At the opposite end of the box, cut two rectangular holes, 1½ inches by 1⅜ inches; separated by a distance varying from ¾ inch to 1⅛ inch. It will be better to cut these holes in separate pieces of tin or card, and to make them slide in grooves at the top and bottom of the box. A diaphragm is to be fixed inside the box, so as to keep the pictures to their respective eyes. The inside of the box is to be blackened.

Hold a stereogram in one hand, at a distance of 6 or 8 inches from the end of the box; look through the eye-holes; then if, when the eyes are shut alternately, one picture appears at each rectangular opening, when both eyes are opened together the stereoscopic picture will appear.

The easiest method of adjusting the openings, is to look through the box at some rather distant object, say the opposite side of the room, and, if the same field of view appears in each, they are properly adjusted; and if the stereogram be interposed at the specified distance, still keeping the eyes as if they were looking at the wall, one stereoscopic image will be seen.

The whole box looks something like the following:—



The dotted lines are the parts which are not seen.

X. P. R.

POSITIVE PRINTING.

Sir,—I have seen very frequently in the "News" inquiries as to "How the tint on the pictures, reviewed at vol. i. p. 281, was obtained?" Together with the reply, viz., "We do not know—it is a secret." Knowing that difficulties, by perseverance, may be overcome, I now give you a formula which will give you that tint with great permanency:—

Exciting bath—

Nitrate of silver	35 to 40 grains.
Distilled water	1 oz.

Float five minutes, and dry; print moderately deep; wash in water two hours; then in salt and water from five to ten minutes—1¼ oz. to 5 pints; then immerse in the

Toning bath—

Chloride of gold	5 grains.
Distilled water	10 ounces.
Carbonate of soda	30 grains.

Let the print lie in this until a dark brown (not a purple) tone is obtained; then remove, and wash in the following bath:—

Soda (for washing purposes)	5 ounces.
Water	1½ gallons.

Let the print remain from seven to ten minutes, and then fix in

Hyposulphite of soda	6 ounces.
Water	20 ounces.

Let the prints remain for fifteen minutes, and use fresh hypo. every time. Wash well for 24 to 36 hours. You may get a nice purple tone if the print remains long enough. Canson's paper is the best, but Papier Saxe is pretty good.

Silverpen.

MAXWELL LYTE'S GOLD TONING PROCESS.

Sir,—In Mr. Maxwell Lyte's beautiful gold-toning process, which I have tried with great success, "*Spanish white*" is used with the hypo. bath. Now, there are two Spanish whites, one—that which I have used—is trisnitrate of bismuth, which gives the hypo. solution a dirty brown colour, but does not seem to be at all detrimental to the print. The other Spanish white is the softest and purest white chalk, which I have *not* tried.

I should feel very much obliged if you would inform me which Spanish white is correct, and *why* it is used.

Spanish White.

[Our correspondent has used the wrong article. White chalk (carbonate of lime) is the one intended by Mr. Lyte, and its object is evidently to prevent the possibility of the fixing bath becoming acid by use, which it would effect by combining with the acid and forming a lime salt, with evolution of carbonic acid.—Ed.]

SPURIOUS ALBUMENISED PAPER.

Sir,—Considering the large number of individuals—professional, quasi-professional, and amateurs—who practise the photographic art, and the consequent patronage which dealers in material enjoy, it seems to me rather too bad that deception and cheating should thrive as they do.

For instance, I inclose you two pieces of albumenised (?) paper, purchased at ——. When floated on the sensitising bath it quickly parts with its glossy surface, and is quite unfit for printing: in addition to which, it rapidly discolours the silver solution.

In my opinion it is glazed either with gelatine or gum—certainly not with albumen.

From sympathy with any unfortunate person who may have been duped to the same extent as myself, I have been induced to trouble you thus, hoping that the deception that has been practised may be my excuse.

T.

PHOTOGRAPHIC QUOTATIONS.

A correspondent has favoured us with the two following photographic sentences; a collection of similar classical allusions would be of interest to many of our readers:—

"—— a principiis adscendit motus et exit,
Paullatim nostros ad sensus —— ut moriantur;
Illa quoque in solis quæ lumine cernere quimus
Nec quibus id faciant plagis ad paret aperte."

Lucretius ii. l. 140.

"Res ita convortant formas, mutentque colores."—*Ibid.*

We have several times, in the course of our reading, met with similar curious allusions, and will, in future, make a note of them for the benefit of photographers. A facetious friend has suggested the appropriateness of Shakspeare's—

"Show his eyes, and grieve his heart·
Come like shadows, so depart."

As a motto for a collection of photographs.

ANSWERS TO MINOR QUERIES.

Wax in Collodion.—*Bungler* complains of reticulated cracks forming over his collodion positives when drying; he is aware that this is owing to the employment of inferior collodion, but asks if we cannot suggest a remedy which will allow him to use up what he has by him at present, as he cannot afford to throw it away. We have found that the addition of a few grains of pure white wax to an ounce of collodion much increased its toughness, without in any way injuring its good qualities, and we would therefore suggest the addition of this, or some body which might act in a similar way (such as India rubber, which, however, we have not tried), in the proportion specified above, as being likely to improve the inferior collodion, if it does not entirely remove the reticulation.

Reduction of Silver Solutions.—*J. Broadley* has accidentally poured about 10 ounces of a 60 grain silver bath into 6 ounces of positive developing solution, and now asks how to get the silver from the same. Place in a flask, and boil it until the reaction between the developing solution and nitrate of silver is complete, and no more precipitate falls; then, if silver still remains in the solution (which may be told by a drop of salt solution forming a precipitate in a small quantity of the filtered liquid), add more positive developing solution until all the silver is precipitated. Then filter or decant from the precipitate, boil for a few minutes with dilute hydrochloric acid, and wash well until some of the solution filtered off is no longer acid to test paper. The result will be metallic silver in the state of a grey powder.

Removal of Silver Stains.—*S. A. H.* A correspondent, "Raven," has informed us that he has found, from experience, that the best thing to remove stains from the fingers is bichloride of mercury dissolved in warm water; dip the fingers in, and the stains disappear by rubbing.

TO CORRESPONDENTS.

Proposition for Exchanging Stereoscopic Pictures.—In our next number we propose to publish a list of names and addresses of those of our subscribers who may desire to exchange stereoscopic pictures with each other. It must be clearly understood that we take no part whatever in the matter beyond this publication, and that all applications must be made directly to the persons concerned. To prevent fraud, however, we may suggest, that it will be advisable that no application be received except from one of the persons whose name appears in the list, unless, indeed, a picture be forwarded with it. We would suggest that each should be properly mounted, ready for the stereoscope, so as to obviate all possibility of complaint on that score. The exchange of stereoscopic pictures need involve no correspondence; as the publication of the name in the list will imply that such individual will, on the receipt of a picture with the name and address of the sender, forward one of his own in exchange; and this without any consideration as to whether the picture received be more or less beautiful than his own. We assume, of course, that no man will send any other than the best picture that can be printed from his negative, and, also, that each will be guided in his conduct in the matter by the golden rule of "doing unto others as he would that others should do unto him."

Since we first published the above, we have received several communications, suggesting various alterations, all of which have been carefully considered; and the conclusion at which we have arrived has been, that to make any alterations would be unadvisable, and would, possibly, open the door to misunderstanding. The suggestion which was made in two or three cases was, that it should be allowable to send the pictures unmounted, as it would give greater facility of transmission through the post-office. With respect to the latter reason, we think our correspondents are in error. A mounted picture can be sent through the post for a penny, and the card serves as a protection. Moreover, we are convinced that the convenience of those who desire to exchange will be far better consulted by making it imperative that the picture should be mounted, as a very little consideration will show; because it must, as a matter of course, be less trouble to mount twenty pictures all alike than twenty different subjects. We amend our proposition so far as to suggest that any gentleman who desires to exchange two or more pictures from different negatives, can have it so stated in the printed list. We must remind our subscribers that they must send their names without delay, as the list must soon be closed.

Photographs in Natural Colours.—"A Subscribing Amateur," "J. W. W." "Victor," and other correspondents have written, in answer to the article on the above subject, which appeared in vol. ii. p. 17, to say that they have partially succeeded in accomplishing this desideratum. If they will kindly forward a specimen or an account of the process, we shall be happy to give the subject all the prominence which so important a discovery deserves.

P. L. G.—Your solutions containing gold may be mixed with the silver residues, and the whole reduced together, first to the state of sulphide, and next to the metallic state as described in our first volume. On dissolving the metallic silver in nitric acid, the gold will be left behind as a dark brown powder, which assumes a metallic aspect when burnished.

R. M.—1. The specimen of paper is both salted and albumenised, and may be rendered sensitive in a 60 grain silver bath. 2. See p. 43, vol. i.

C. H. Paine.—1. The spots arise from a drop of some chemical, most probably hypo., having touched the paper in one of the previous stages of its preparation. 2. We do not advise you to discard a process which you are proficient in for a new one, however highly spoken of. You can, however, try the collodio-albumen process. 3. Consult vol. i. pp. 72. 83. 4. We shall be happy to insert your name upon the conditions mentioned above. They have been framed to suit the wishes of the majority.

H. D. H.—A correspondent who favoured us with a letter signed "H. H. H.," which was inserted at p. 142, vol. i., is informed that we have a letter waiting for him. To what address shall it be sent?

W. L. C.—1. You will find it advisable to keep some pieces of metallic cadmium constantly in your stock bottle of collodion. 2. We have seen some very excellent reflectors made of earthenware coated with a reflecting surface of metallic platinum, but we do not know where they are to be procured.

H. S. I.—1 and 2. Will be answered in our "Answers to Minor Queries." 3. We will endeavour to do as you wish.

A. Elsden.—From the description your camera must be a very excellent one, and well worth bringing before the public. More than this we cannot say unless we were to see it.

J. W. G. Gutch.—Received.

P. S.—In the question the words "previous to" should have been "after."

G. Restall.—Your picture is a very good one, but still our opinion is unchanged; we think the ordinary negative process would have given you a better picture of the same subject. We can see several faults in it which may be traced to the intensifying process, although it is one of the most perfect specimens of a print from an intensified positive that we have seen.

J. Heywood.—We cannot insert your name except you comply with our regulations. You attach too many conditions to the proposed exchange, and your specimen print is not sufficiently good to render it desirable to comply with them.

H. F.—The process is described at vol. i. pp. 56 and 85.

H. Bath.—Received.

C. C.—The gun cotton with which the collodion is made is not good, or there is too much water in the alcohol and ether used as a solvent. Collodion by a good maker should not give that reticulated appearance on the picture.

L. D'Ebloux.—Received.

Earnest.—1. Of the processes you name we decidedly prefer the wet collodion; next to this the waxed paper and calotype processes. 2. A furnace suitable for the reduction of residues can be obtained at most wholesale dealers in chemical apparatus.

A. Nicholson.—Received.

Louth.—The aplanatic are the best of those which you have mentioned.

P. Y. G.—Your photoglyphic print is very successful; and with a little more practice you will, we doubt not, succeed in producing some excellent pictures. The copal powder is not fine enough, and the *biting in* process has been continued rather too long, which has given a faint, flat appearance to the dark shadows. Your plate is, however, capable of producing a much better print than you have enclosed us, in the hands of one who has had experience in this kind of printing.

J. S. B.—Consult the article on the subject in No. 25.

A. T. Stafford.—1. Five ounces of hypo. to twenty-five ounces of water is the correct proportion. 2. From ten minutes to a quarter of an hour. 3. Mix an ounce of powdered Spanish white with the above quantity of hypo. bath; it will make a milky-looking liquid. 4. The operation need not be conducted in the dark after the print has been immersed in the toning bath. Too bright a light should, however, be avoided.

J. B. B.—We have not been able to procure the authentic account, but will give it as soon as obtained.

Rainbow.—1. We do not think the mixing of the two baths has anything to do with your "rainbow" hues; the fault is more likely to be in the pyroxyline. 2. We do not know where you can obtain the collodion you name.

W. Stonehouse.—Received.

Excelsior.—It will be best to purchase a camera on purpose. One may be procured at a very reasonable price.

R. E. T.—A lens such as you wish for may be purchased for about £4 10s.

G. S.—Gelatine, 128 grains; water, 14 ounces; absolute alcohol, 2 ounces.

H. H. Allen.—Received.

G. W. Y.—A process for obtaining the tint you so much admire (Ogle and Edge's) will be found in the present number, described by "Silverpen."

J. B. Robinson.—We are not aware that citrate of iron has been proposed as a developer; can our correspondent give us a reference to any published account of it?

T.—We think we best show our sympathy with our correspondent by publishing to our readers the fraud which has been practised on him, which we have done in this present number. Much dishonesty is practised in respect to photographic materials, and we do not think that any plan will prove so effective a preventative as making public a few instances.

Blue Light.—Our correspondent's suggestions are received, and will meet with due attention.

G. F. E. Hawke.—1. It would be impossible to throw any light on the peculiar fogging which you experience when taking a particular view, unless we were to personally inspect your whole operations. 2. Chloride, terchloride, and sesquichloride of gold are the same substance; the difference is due to a little uncertainty which at present exists in the chemical nomenclature, owing to the real equivalent number of gold not being yet satisfactorily settled. 3. Certainly; as many prints can be toned in succession in Maxwell Lyte's bath as is usual in such baths. 4. There will be no objection to your using bromide of potassium, provided you can succeed with it.

H. T. Taylor.—Judging from the plan you have enclosed, you have chosen the best aspect for the glass room.

G. Walker.—See Mr. Sidebotham's papers on the collodio-albumen process.

J. W. Love.—The cause of the stains on No. 1. is imperfect washing; the picture is fading out. The reason of the grease-like marks on the face of No. 2 appearing when you applied gum to the back is, that the soaking in water had dissolved out the size from the paper, and allowed the gum to soak through. Re-sizing the paper with gelatine, or mounting the print with starch paste, would have obviated this.

Enquirer.—Your nitrate of silver is most likely impure; it is to this cause that the weak solarised appearance of the light parts on over exposure is generally due. If that is not the case, add one grain of bromide of cadmium to each ounce of collodion, and put six grains of acetate of soda into twenty ounces of the nitrate bath.

J. E. Coward.—Received.

D. Combe.—If our correspondent will forward specimens to our office, his discovery shall receive every attention which it deserves.

D.—Your suggestions are received with thanks.

J. H., Junr.—Possibly your hypo. is impure. Increase the strength of the soda bath to 1lb. to the gallon.

T. Clark.—Received.

Communications declined with thanks:—Sir H. H.—A Platonian.—F. S. W.—Harry.—A. B. C.—M. L. O.—J. S.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Hypo.—A Subscriber.—S. O. X.—A Friend.—E. A. R.—O.—T. B. C.—Amateur.—W. C. E.—John W. W.—White Frost.—Folio.—X. L. N. T.—Harvey.—Nitrate.

In Type:—S. Highley.—J. W. Fall.—H. E. N.—T. G.—[illegible].—J. N.—Thomas Clark.—J. G. Dear.—F. Δ.—W. L. S.—J. R.—T. B.—C. A.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 2d.

_ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 31.—*April* 8, 1859.

PRINTING BY DEVELOPMENT AND OTHER METHODS.

As I have before stated, my opinion of our wants in photography is that the greatest boon any man could confer upon us, would be a really good printing process which we might use in any weather, and with great quickness. During the last three or four months any man would be sorely puzzled to take a great number of copies from a paper negative, either calotype or wax-paper—or even from a collodio-albumen plate, which prints much more slowly than plain collodion. It was to remedy this great want that I have been engaged some months in experimenting on printing by development, and now you have my results.

My first difficulty was to preserve the clean whiteness of the skies—this I never could accomplish with the serum (of milk) process—they always had a dusty appearance, and seldom possessed any brilliancy. My next attempt was with iodide of silver—in fact, a modified calotype—but the lights were so peculiar, and the shadows so "dead," that minuteness was all I could gain in that attempt. Then I changed to the citrate of silver; there I got both clean skies and minuteness, and whilst washing the pictures they appeared very beautiful; but *in drying* they lost all their brightness, and even a coat of good varnish could not restore them to their former appearance.

The reader will, doubtless, wonder what induced me to follow up so many failures, but when he hears that the finest plain-paper print I ever got during all my photographic experience was a developed one, he will no longer be surprised at my infatuation. The whites were ivory-like in softness, and the shadows so transparent and brilliant that no sun print could rival it. For months I tried to produce another equal to it, but could not; and, to this day, it is a mystery to me how that print could be so thoroughly different from others taken in the same manner and at the same time.

I now give you what seems to me the best developed printing process. Take any quantity of the whites of fresh eggs, and to each ounce of this add

Chloride of ammonium	4 grains.
Citrate of soda	4 ,,

and water sufficient to dissolve these salts; beat up well, as in other processes, and float the paper upon it for three minutes, hang up to dry; this will keep a long time.

The citrate of soda is made by neutralising 112 grains of pure citric acid with 133 grains of dry bicarbonate of soda. But in many places it may be procured at the druggist's.

To excite this paper use 30 grains nitrate of silver, 30 minims pure acetic acid, 1 ounce distilled water; float the paper four minutes at least upon this, and dry in a perfectly dark place. Of course the operator must be particularly careful not to allow the faintest light to fall upon it when it is, or has been, upon the silver bath.

The exposure is from one minute to ten, the best guide being the appearance of the print. If all, excepting the very lightest parts, is visible, the exposure has been long enough.

The next stage is the development. The greatest plague in this process lies here. Often have I washed my dishes with *strong* solution of cyanide of potassium, and yet the print has become marbled; whilst, when I have turned up the edges of the print, making it into its own dish, I never had a single stain: the print should not be over-developed, as it loses nothing in fixing or toning. A saturated solution of gallic acid is used for this, and as the print is never washed before development it needs the addition of no silver whatever. If the room, however, is *warm* in which the print is developed, a mixture of equal parts saturated solution of gallic acid and water is strong enough.

To fix, use one part hyposulphite of soda in six parts of water, and allow it to remain in this solution 15 or 20 minutes.

The prints may be toned with gold before fixing, as in other processes; but, if possible, until they are placed in the hyposulphite, they should not be brought into the light; as, even after well washing when developed, they are very liable to be rendered dirty-looking by the light.

This has proved, in my hands, the very best developing process I have ever attempted to print by. It has, however, one fault—the *only* drawback to this mode of printing—the pictures are often *hard*, and want smoothness in the halftones; yet, for one class of pictures, it is better even than sun printing, viz., the copying of old manuscripts, etchings, &c. A few months ago I copied an original etching of one of our old masters; and, as the weather was bad, printed the copies by the above method, and they proved about as perfect as they could well be. In this class of picture, too, if the exposure of the print is not quite so long as usual, the development has of course to be pushed a little further, and then the picture needs no toning, the hyposulphite not causing enough disagreeable redness to injure it at all. Etchings brought out in this way are beautifully clean; and the albumen in common objects prevents the lights sinking, and so gives much better pictures than the plain paper.

One observation I have to make on the common sun printing process. Why cannot every seller of albumenised paper label it as prepared with the quantity of chloride used in its making? Day after day I am asked by friends what causes a mottled appearance on their prints—the fact is, they have been using one man's paper, prepared, perhaps, with six grains of chloride to the ounce, and then they get some other make, prepared with 20 grains. Even an old photographer often spoils by this omission a lot of sheets before having tried them. One or two of our best men do attend to this, but not one in twenty.

Θ

CAUTION TO PHOTOGRAPHIC ARTISTS.

A case of some importance to photographic artists has lately occupied the attention of one of our metropolitan police courts, wherein Mr. Brooks, a photographic artist in Oxford-street, summoned Mr. H. Mills, a tobacconist, his neighbour, for wilfully destroying two portraits exhibited in his show-case as specimens. The defence was that the portraits were likenesses of the defendant's wife, and were exhibited without his consent after he had several times complained of the act. On hearing the case, Mr. Bingham, of whose high magisterial ability no one can raise a doubt, deemed it of sufficient importance to take time in considering his judgment before delivering it; or, in other words, to afford him time and opportunity to investigate the law of the case, and, if possible, to find a precedent or authority to guide him to a just decision. For this purpose a week's adjournment took place. On Saturday last, Mr. Bingham, in giving judgment, said:—"It appeared that the complainant had purchased the business of a photographer, together with the stock, which contained, among other articles, the portraits of defendant's wife, and these portraits were hung up at his door as a specimen of his style of art. The defendant requested that they might be removed, but this request being refused, he obtained his end by destroying the works with a stick. Whether an artist, an alehouse-keeper, or any other person might, after notice of objection, seek to attract customers by hanging up a portrait of his neighbour's wife as a sign, either for its beauty or deformity, was, at least, very questionable; but, even if the exhibition was a nuisance, which the law would compel him to abate, it was clearly unlawful for the defendant to redress his grievance by violence. He must, therefore, pay for the damage done; but, inasmuch as the exhibitor was, under the circumstances, entitled to no sympathy, the amount must be limited by a rigid estimate. The defendant must, therefore, pay one guinea for the damage, and 2s. costs of summons."

We think no one will quarrel with this decision; the defendant was clearly wrong in the course he adopted to obtain redress for his grievance; but does that make the complainant right? That is the question which has induced us to transfer this case to our columns, and to give a friendly caution to those of our readers who may find themselves in a similar position to Mr. Brooks. We can readily comprehend the feeling of this gentleman, in standing upon what he believed to be his rights, in exhibiting that which he had paid for, and in following the example of his brother artists. Whether the superior Courts of Law or Equity would uphold that view of the question seems very doubtful; and, in the absence of any reliable judicial authority on the subject, which we must assume to be the case in the absence of all reference to one by Mr. Bingham, we would not recommend our photographic brethren to covet the martyrdom of trying the question with another Mr. Mills, who, being less irate, might proceed more skilfully to accomplish the object of compelling the removal of a portrait, in which he might be deemed to have a personal interest, at the expense of the exhibitor. However little the cost might be, we would not recommend the attempt, not only because we feel that the exhibitor would become a martyr in his endeavour to maintain a supposed right, but for a reason which, we venture to think, in the interest of photography, should be paramount with all who are engaged professionally in the art, and that is—*not to offend the public.*

We should hold it to be exceedingly bad taste for an artist, even if the law clearly permitted him, to continue to exhibit the portrait of a person to whose feelings it was offensive. No good object can be gained by it, and we see no necessity for showing up people in private life, who do not covet the honour of a niche in a photographer's specimen case; while there are so many, who, in the language of the immortal Barnum, "if not kept well before the public, languish and die."

It may, however, be interesting to photographers to know that our cousins over the Atlantic have also had a little turn at litigation upon a photographic matter, in which the question of the right of photographers to publicly exhibit a portrait was accidentally introduced, and had a bearing on the case with reference to the rights of the parties. The case is that of "Jeremiah Gurney *v.* Elias Howe." Without troubling our readers with the particulars of the case which it is not our object to dilate upon, we refer to the fact, that the plaintiff had publicly exhibited a portrait at the Crystal Palace Fair of 1857, and thereby, as the defendant contended, had adopted the picture as his own: that such exhibition had been without the defendant's leave and licence, and he, therefore, sought to repudiate his liability to pay for the picture for that and other reasons. The court and jury, however, took a different view of the case, and returned a verdict for the full amount sought to be recovered. It does not appear, in this case, that the defendant had taken any steps to object to the exhibition of his picture, and it is to be inferred, therefore, that the jury, in the absence of any protestation on the part of the defendant, would deem him to have acquiesced in the public exhibition of the picture by the plaintiff, and, therefore, not concede to the defendant any benefit of such a point of defence.

COMPARATIVE EXPERIMENTS ON SOME OF THE DRY PROCESSES.

BY MR. JOHN DRAFFIN.

I have noticed lately in your valuable journal several communications on the value of certain dry processes. Now, I have, for the last twelve months, been professionally engaged in the "stereo trade," and have made a series of experiments to enable me to ascertain, for a certainty, the process most suitable to me for out and in-door work. I have, now, for several years practised the collodio-albumen process; but as a late and lamented friend of mine (Mr. Hepworth, of Manchester, an old collodio-albumen practitioner) strongly recommended me to try Fothergill's process, I determined to work for some time with the following, viz.:—Taupenot's, Norris's, and Fothergill's. Every negative I took for several weeks I made three copies of, viz.:—one by each process. To make sure, I had separate baths for each, and to be doubly sure, a friend of mine and myself have had, at different times from a London house, plates prepared by Norris's, and Fothergill's process.

I will take Fothergill's first; I have obtained some good negatives by it, but the time expended is double that required by either Norris's or Taupenot's; and for interior views it is utterly useless.

Respecting Norris's, I cannot speak too highly of it. I have done some very good things indeed with it, but the exposure required is longer than Taupenot's, and for interior views I have not done so well; still, if I wanted to abandon the latter I should certainly prefer Hill Norris's to any other I have tried.

Now for the collodio-albumen; the inclosed picture may be shown as a fair specimen of what the process can do; worse subjects you could scarcely have, owing to the want of light, even the little I had came through tinted glass, as you will scarcely find a plain window in York Minster. The "Organ Screen" is situated in deep shade, yet I obtained what you see in 45 minutes; the "South Aisle," which is full of tinted glass, I obtained in 25 minutes; the "Tomb" in Lady Chapel, in 20 minutes. I could show you other subjects quite equal, taken in the same building, but on which scarcely any light falls, and for which I have given an exposure of two days. Now, as I said before, I tried the other processes at the same time, but the result was a complete failure, and I am perfectly satisfied that the collodio-albumen process is *the one* after all. The exterior view, viz.:—the "Battery and Lighthouse" at Liverpool, I exposed on a bright day 45 seconds. I use a 4-inch focus lens, 5-6 stop. Now, how is it that some people can (at least they say so) obtain, by Fothergill's process, good pictures in 30 seconds with the same focus lens and stop I mention?

I shall not attempt to go into any details in the working of Taupenot's process here, because that has been so ably done of late by Mr. Sidebotham, suffice it to say that my mode of working has for some time been similar to his. I use two nitrate baths, and prefer a thin collodion and the albumen perfectly clear; in fact, I always allow it to stand three or four days before using, and then decant it off clear.

I shall be glad, if you wish it, to forward you prints of the three processes of subjects taken at the same time and exactly the same exposure.

I inclose a copy of the "Choir and Great East Window" of the Minster. Now, any one who has been in the choir knows what little light falls on to the woodwork. The picture I send is rather over-printed, but in the deepest shade you will find all the detail. Now, to obtain this picture I exposed for *four hours*, yet you see the Great Window has not suffered so much as you might expect after such an exposure. There is a most remarkable thing connected with this negative, and that is—that in the window I have most distinctly the following tints:—*yellow*, *red*, *green*, and *purple*. I at first thought it might be an accidental deposit from the developer, but I find the same colour exactly in both windows and in the same places, and what is more, I have had the negative at the Minster and compared it with the window, and find that the red and green are correct with the shades in the window; I cannot account in any way for it, but so it is, and I shall be glad to show it to any one who may wish to see it. The picture of the Choir—(a singular specimen, unfortunately spoilt through "spherical aberration")—I took from the gallery of the Great East Window, but not having distance enough, you will see that the mullions and pillars are very much out of the perpendicular; I think I can remedy this in another view I intend taking. But what I wish to call your attention to in this picture is, that I placed the camera in its place on Saturday evening, taking off the caps; I went for the camera on Monday morning, and, in developing, found I had caught two or three of the canons and choristers, in other respects the negative is not good; still you will observe in this picture detail in the deepest shade, and, of course, deep shade in a cathedral is deep enough and no mistake. You have had plenty to show you lately from several gentlemen, especially Mr. Woodward, of Nottingham, what the Taupenot process can do out of doors I send these specimens to show what it can do *in doors*.

DRY AND WET COLLODION.*

BY M. L'ABBÉ DESPRATS.

The collodion prepared in the manner we have described and used at the proper time, ought to give a satisfactory result. Sometimes, however, and especially if an ether too high in the scale of degrees has been employed, it will be found that in the pictures it gives there is a want of general harmony. The blacks may have acquired considerable intensity, while the half-tones are barely indicated. In this case, the black deposit formed by the developing agents, will be rather plastic than crystalline; as a result of their prolonged action, the deposit becomes more and more irregular, and the design confused and devoid of clearness. This drawback is a very grave one; it is not, however, irreparable. Before we point it out, we will enter into a little consideration of the intimate structure of the sensitive film. This examination will, perhaps, lead us to a knowledge of the cause of the drawback we have referred to.

An examination of the manner in which the film which covers the collodionised glass is formed, leads to the discovery that this film, under the best and most favourable conditions, is not completely homogeneous and unique, but is composed in reality of two distinct superposed films, the one adherent to the glass, the other superposed on this. The first is pyroxyline, that is to say, normal collodion with a very little iodide; the second, on the contrary, is composed almost exclusively of iodide and very little pyroxyline. There is, therefore, something like a mechanical departure from the constituent principles of the collodion, a departure which has no other cause than the sudden evaporation of the alcohol and the ether placed in contact with the air over a large surface. An effect is produced in that case comparable with that which takes place on the drying of sized paper. According to M. Payen, the liquid size, introduced uniformly into the pulp of the paper, becomes, as a consequence of the desiccation by the air, fixed on each surface of the paper alone, while the interior itself retains scarcely any. For the sizing to be perfect, a combination of favourable circumstances is requisite, in which the humidity and the ambient temperature play the principal part. The iodides dissolved in the collodion are, therefore, brought to the surface of the film opposed to the glass, in the same way as the size introduced into the substance of the paper attaches itself to each surface. And as a paper is never really well sized, except at its surface only, so a really well-prepared collodion is only good so far as it will allow the iodides to move freely to its surface in contact with the air.

Under such conditions the film of iodide is very easily permeable to the sensitising and developing agents thus brought in immediate contact with a perfectly divided, and a—so to speak—spongy matter. It will be readily conceived that if the conditions of texture are different, that is to say if, from a vicious preparation, instead of a spongy superficial film, we have one very compact, in which all the principles are energetically retained, there will be a much greater resistance to the sensitising agents, and a much more difficult access will be presented to the developing agents called in to complete the sun's labours.

Collodions prepared with a strongly rectified alcohol and ether are subject to this fault of impermeability, and, for this reason, we are opposed to their use. It may sometimes happen though, that, even with alcohol and ether less highly rectified, this fault will present itself in a more or less marked degree. If it is not very strongly marked, it may disappear after a few weeks from the reaction of the constituent principles of the collodion; but with time arrives another fault—the diminution of sensibility; it is, therefore, important to obviate the present evil. Now, there is a possibility of doing this very easily, and we may add, moreover, very efficaciously. It is only a question of modifying the molecular constitution of the collodion. Resin, which we advised to be added to the collodion for facilitating operations by the dry process, will, moreover, cause this fault to disappear. Resin, without taking anything from the tenacity of that part of the collodion film adherent to the glass, gives to the other part of the film which it supports greater permeability; hence, greater facility of access to the different baths, the successive actions of which it will subsequently have to undergo. We are not aware of the extent to which this addition of resin may be carried; but it may, without inconvenience, be carried to one or two per cent. of the collodion ready to be used.

Lessons on Colouring Photographs.

COLOURING IN OIL—(*continued*).

Third Painting.—The second painting thoroughly dry, the process of oiling out must be repeated prior to commencing the third painting. In this painting, the picture will usually be finished; extreme care will therefore be required, and no pains must be spared to obtain a faithful likeness, as well as an artistic picture. The various spirited touches which give life to the head must now be put in. Soften hard lines, especially about the hair and eyebrows; the shadows of the face may be again glazed with a warm transparent tint; points of high light, that are to remain unsoftened, must be put in with a light, firm hand, a small pencil being used for the purpose. The colour of the cheeks and lips must now receive their finishing touches, keeping them pure, and as brilliant, at least, as nature.

The draperies must now be retouched—strengthening the lights by bold touches, and deepening the shadows by another glazing where it is necessary. Finish the painting of the background, and examine carefully that no little point is neglected. The painting is then completed, and ready for varnishing.

The last process in oil painting is varnishing, by means of which the colours are made to bear out in their fullest freshness, brilliancy, and force, and, at the same time, the work is preserved from injury and decay. Where circumstances render it convenient, this is better delayed for a few months after the painting is completed. The reason for this is found in the fact, that linseed and other oils, in the process of drying, and by exposure to the atmosphere for the first few months after their application, attract oxygen, and become decolorised, by which process the pigments with which they are mixed acquire additional purity. The picture should be varnished when this effect is produced, by which means further oxidation, which would result in the oils becoming again dark and discoloured, is prevented. In many cases it will be inconvenient, or impossible, for the photographer to allow this interval to elapse between painting and varnishing his picture. He must assure himself, however, that his colour is sufficiently well set before attempting to varnish, or he will inevitably ruin his work. Mastic varnish will be found, for many reasons, the most suitable for the purpose. Copal, and the hard varnishes generally, when applied to a newly executed painting, are very apt to damage it by cracking. It is eminently conducive to good varnishing, in all cases, that it should be performed in fine weather, in a room of moderately warm temperature; and that currents of cold or damp air should be avoided, as chilling or blooming of the varnish would probably be the result. If a varnish have bloomed, a very slight portion of oil rubbed over the surface, and then polished off with a silk handkerchief, will remove it.

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* Continued from vol. ii. p. 40.

In the limited space at our command, we could but briefly indicate methods and processes of painting in oil; we hope, however, sufficiently to enable the persevering student to set efficiently about the work, in which, by care,, attention, aptitude, and much practice, he may become perfect. In our next lesson the use of water colours will come under attention. Meanwhile, we commend the following maxims in colouring, extracted from the valuable work on colouring photographs, published at this office, and by Newman, of Soho-square, to the careful study of the colourist; the principles laid down are equally applicable to every style of painting:—

1. Flesh as it retires from the eye appears to grow colder in tone.
2. The edges of all cast shadows are grey.
3. The high lights of flesh should be of a yellowish-white.
4. A judicious subordination of the half-lights to those which are more prominent ensures brilliancy.
5. As light is colour, every gradation to shadow is a gradation from colour; and shadows therefore should never be too bright.
6. Local colours are not found either in lights or shadows.
7. Cold colours, or those approximating to blue, retire.
8. Warm colours, or those approximating to orange, advance.
9. Contrasts give brilliancy of effect; but they should never be violent or inharmonious.
10. The style of execution should vary with the subject, to aid in expressing character;—vigorous and bold in a man, delicate and tender in a woman.
11. Colours should be laid with as little rubbing with the brush as possible, to keep them fresh and bright.
12. Avoid harshness. Let every line be softened; for in nature there are no real outlines, although the boundary of sight is distinctly marked.
13. Keep all cast shadows of one tone, and always warm (except at the edges), varying of course with the local tint.
14. Keep reflected lights warm, unless the object from which they are derived is visible; in that case, they partake of its especial colour.
15. Where the outline of a figure is ungraceful, it may judiciously be lost to some extent in the shadow of the background.
16. Massing lights and shadows together will ensure breadth and grandeur of effect. A skilfully-managed background will greatly aid in this respect.
17. Carefully preserve transparency in the shadows.
18. Colours should be kept pure and transparent; truthful to the subject, and harmonious both with each other and the nature of the picture.
19. Every part of the background should appear to retire from the figure, which should never seem to be cut in or inlaid.
20. The most careful manipulation and elaborate finish will be tame and ineffective without a perpetual attention to the proper preservation of breadth of light and shade.

(To be continued.)

Dictionary of Photography.

Carbonate of Potassa. This is a very important salt in the arts. It is prepared on the large scale from the ashes of plants; these are extracted with water, and the solution evaporated to dryness and calcined; the result is the crude pearlash of commerce. This, as might be anticipated from its mode of preparation, is very impure; it is purified by adding to a certain quantity of it its own weight of cold water; from the superior solubility of carbonate of potassa to that of the impurities, these are left behind, and, on evaporating the filtered solution to a small bulk, and allowing to crystallise, the carbonate separates out, in a comparatively pure state. If required in a still purer form, it is best to prepare it by igniting to redness purified cream of tartar (bitartrate of potassa), extracting the residue with water, and evaporating to dryness. Carbonate of potassa is a highly alkaline salt, very deliquescent and soluble in less than its own weight of water. It is insoluble or nearly so in alcohol. Its great attraction for water renders this salt of great use in the photographic laboratory, where it is employed for the purpose of dehydrating various substances. Alcohol may be rendered anhydrous by shaking highly rectified spirit with ignited carbonate of potassa, which forms a watery layer beneath the alcohol, or at least becomes pasty. The alcohol, whose density is then 0·815, is poured off into a retort containing twice its weight of pulverised and recently ignited carbonate of potassa, left to stand for 24 hours, and then two-thirds of it distilled off. Carbonate of potassa is also largely used in the manufacture of soap and glass.

Carbonate of Silver. Prepared by precipitating nitrate of silver with an excess of carbonate of potassa or soda, filtering, well washing, and drying the precipitate. If these operations are conducted in the dark room the carbonate of silver will be obtained in the form of a pale yellow powder, which will be found very convenient for the preparation of small quantities of silver salts, such as the acetate, &c., which may from time to time be required for experimental purposes. Carbonate of silver will remain unchanged if kept in a stoppered bottle in the dark, but it rapidly changes colour when exposed to light.

Carbonate of Soda. This is a most important salt to the photographer. Enormous quantities are made in England by Leblanc's process, which consists in forming a sulphate of soda by the reaction of oil of vitriol upon chloride of sodium. $Na\ Cl + HO.\ SO_3 = Na\ O.\ SO_3 + H\ Cl$. The sulphate of soda is then heated in a furnace with ground coal, which removes the oxygen in the form of carbonic acid, and leaves sulphide of sodium. $Na\ O,\ SO_3 + 2\ C = Na\ S + 2\ CO_2$. The sulphide of sodium is next heated with chalk (carbonate of lime), whereby the sulphur and carbonic acid change places, producing carbonate of soda and sulphide of calcium. $Na\ S + Ca\ O.\ CO_2 = Na\ O.\ CO_2 + Ca\ S$. The sulphide of calcium uniting with another portion of lime forms a peculiar compound insoluble in cold water, the carbonate of soda can be dissolved out and separated by filtration; on evaporating the solution to a small bulk, commercial carbonate of soda is deposited in large transparent crystals, which generally contain 10 equivalents of water. These crystals dissolve in two parts of cold, and in less than their own weight of boiling water; they fuse in their water of crystallisation when heated, and the liquid, if exposed to further continued heat, dries up to a white powder, which melts at a red heat without undergoing change; this is anhydrous carbonate of soda, and it will be found very convenient if a large quantity of the salt is kept in this anhydrous form in the laboratory, as it is frequently wanted in the reduction of silver residues, &c. Solution of carbonate of soda has a strong, disagreeable, alkaline taste, and a powerful alkaline reaction. It may be purified by passing carbonic acid through a strong cold solution of the carbonate, when crystals of bicarbonate of soda will be deposited; these, after washing slightly in water, are heated to redness, when one atom of carbonic acid is evolved and the result is pure carbonate of soda. It should be kept in solution of the strength of about one part carbonate and four parts water; in this state it will be found of constant use for the purpose of neutralising too much acidity of the nitrate of silver bath; and for various other purposes.

(To be continued.)

A Catechism of Photography.

THE SEL D'OR TONING PROCESS.

Q. Allusion has been made to the sel d'or method of toning; is that process difficult?

A. It is not particularly difficult, neither is it troublesome in manipulation.

Q. Is albumenised paper employed in this process?

A. Albumenised paper may be used, though with less certainty of successful result than with plain papers. The Saxe papier is generally considered the best.

Q. How is the paper prepared?

A. By floating it on the following solution:—

Chloride of ammonium	80 grains.
Gelatine	10 "
Water	10 ounces.

Let it remain on this until it becomes quite flat.

Q. How is the paper sensitised?

A. By floating one minute on a solution of nitrate of silver, fifty grains to the ounce of water, or with ammonio-nitrate brushed on.

Q. How long should the paper be exposed to the light during the action of printing?

A. Only so long as to bring the light parts of the picture to exactly the depth they are to remain when the picture is finished, as the fixing bath does not reduce their intensity as in other processes.

Q. How is the process continued after the printing has taken place?

A. Every trace of nitrate of silver is removed, for which purpose the prints are immersed, face downwards, in a basin of water covered with a board to exclude the light. After ten minutes a teaspoonful of common salt is added, and the prints are allowed to remain in the solution for about five minutes longer. Next they are placed in a solution of—

Water	1 pint,
Ammonia	1 drachm,

until they turn red. They are then washed with running water, under a tap, and laid in a basin of clean water until the toning bath is prepared.

Q. How is the toning bath prepared?

A. In the following way:—Make a few ounces of solution of hyposulphite of soda, one grain of the salt to an ounce of water. Pour two ounces of this solution into a measuring glass, and add one half grain of the crystallised sel d'or. This is sufficient, when newly made, to tone eight or ten pictures.

Q. Will the solution remain good for a long time?

A. No; in a few days the hypo. solution, alone, turns cloudy and is then no longer fit for use; and when the chloride of gold is added it will decompose in a day or two.

Q. How is the toning solution applied to these prints?

A. Level a clean glass upon the levelling stand, and lay the print face upwards upon it. Pour on enough of the colouring solution to cover it, and watch the result. The red hue of the picture will pass in a few minutes to a delicate grey purple. When the tone is well developed, do not continue the action of the toning solution, but pour it back into the measuring glass. Hold the plate and picture for a few minutes under the running water, and afterwards immerse in a solution of hyposulphite of soda, one part hypo., six parts water. The print must then be thoroughly washed, and the operation is completed.

VARNISHING.

Q. Is it not usual to varnish photographic prints?

A. Yes. After being thoroughly washed and dried it is best to cover them with a coat of varnish.

Q. Is it generally regarded as an improvement?

A. It is, if well laid on, and the varnish be of a clear transparent consistency. It is better for some pictures than it is for others; and its employment is a matter of taste which each photographer must consider for himself.

Q. Is there no chemical advantage obtained by varnishing photographic prints?

A. Covering the print with a coat of varnish certainly contributes to its preservation from atmospheric influence, but it is only as a preservative that it is really useful.

Q. Does the print require any preparation previous to receiving the coat of varnish?

A. Yes; before attempting to varnish the print it is necessary to cover it with a coating of gelatine or pure white size. This, of course, must be laid on warm with a broad flat brush, and care must be taken that every part is well covered.

Q. Why is it necessary to use gelatine or white size previous to varnishing the print?

A. Because, otherwise, the varnish would sink into the paper, and utterly spoil the picture.

Q. What description of varnish is generally employed?

A. Different kinds of varnish are used; but spirit varnish will be found to answer exceedingly well.

Q. Most of the photographic proofs are mounted in a similar manner to that which is customary with regard to water colour drawings; is there any chemical difficulty in mounting?

A. None, with the exception of the gum, gelatine, or paste employed in attaching the print to the card-board. All materials that are of an acid nature should be avoided; sour and mouldy paste is also very objectionable; but anything which contains corrosive sublimate is worst of all. Dextrine, or gum, or gelatine, so long as they are quite pure, may be used without risk of injury to the photograph.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

[We have great pleasure in informing our readers that we have been fortunate enough to secure the services of one of the most eminent scientific men in France, as the special correspondent of the "Photographic News." By this means we hope to be able to lay before our readers the very earliest intelligence in all the branches of Continental science.—Ed.]

Paris, April 5, 1859.

An historical sketch of the new solvents for cellulose has been given by Mr. Crookes in the last number of the "Photographic News." This induces me to mention here that a note has just been published also by M. Van Monkhoven, entitled—"A new method of Photography with the aid of solvents for Cellulose" (*Comptes rendus, 28 Mars*, 1859), in which method cellulose is dissolved by an ammonio-cupric solution.

I have also seen a new memoir by M. Niepce de St. Victor, which will appear shortly in *Cosmos*. The objections that have been raised concerning the "new action of light" are here refuted completely. Both light and heat can be made, in these interesting experiments, to produce similar effects. But there are cases, as M. Nièpce shows in this new work, where the effects produced can be attributed to light alone (as, for instance, where the experiments with the insolated tubes take place at freezing point, or with substances which the heat of boiling water is not capable of affecting.) The remark lately published by Mr. Shadboldt, that the effects of light in M. Nièpce's tubes ought to be perceived through a glass negative, has no value whatever. In one of his earliest papers, M. Nièpce showed that these remarkable effects of light could not be transmitted through a sheet of glass, or a lamina of mica, however thin. It is also some time since M. Nièpce showed that heat was capable of aiding light in its mysterious action, and that the same agent taken alone could produce the same effect as light itself—an observation recently confirmed by Mr. W. Crookes. In the new memoir of which we speak, it will be seen that although heat has an action similar to that of light, we must be careful *not* to conclude that light has none. The fact that light in an active state can be shut up in a tube for a long space of time, and, at the end of that time, act upon a sensitive photographic paper *without any intervention of heat*, is incontestably proved.

M. Ponchet in a letter to M. Doyère, of Paris, denies the fact professed by many naturalists of the resurrection of dead animalculæ:—" . . . In 1701, Leuwenhoek announced to the scientific world a remarkable discovery. He pretended that after having killed certain *Rotifera* by complete desiccation, these microscopic animalculæ came to life again the moment they were touched with water. This extraordinary resurrection was confirmed by almost every naturalist living at the time, and afterwards by Hill, Baker, Coëze, Corti, O. F. Muller, Fontana, Spallanzani, &c.,—all these gentlemen believed in the phenomenon of resurrection, and you, sir, also assure us that this biological miracle is a reality. . . . Despite all the deference inspired by your works, I most absolutely deny this resurrection. . . . . Rotifera that are *really dead*, I assure you, never live again. What has led microscopists into error, is the fact that the dried body of these animalculæ, when moistened, imbibes the water and is elongated, becomes once more transparent and appears to live again. It is purely a physical phenomenon, and nothing more. . . . If the observation is continued for twelve or twenty hours, far from witnessing the spectacle of a resurrection, the viscera of the animalculæ begin to dissolve, or the body becomes swollen and the viscera expulsed. I am not the only person," continues M. Ponchet, "that holds this opinion. Oken, Rudolphi, Bory Saint-Vincent, Ehrenberg, and other naturalists of like reputation affirm, as I do, that they have never been able to resuscitate a single animalcule."

Paris, like London, has had its turn of the charlatanism of M. Vries, vulgarly known as "the Black Doctor." This is now probably finished. It was decided that M. Vries, who pretends to have discovered a remedy for cancer, should make a trial at the *Hôpital de la Charité*, where everything he could possibly desire was placed at his disposal. More than a dozen patients were offered him by M. Velpeau, and M. Vries engaged to cure them without any operation, by means of his antidote. The experiments began on the 27th of January last, and have been continued without interruption up to the present time. M. Velpeau has just laid before the Academy of Medicine their results, as follows:—"1st. The antidote for cancer is yet to be found; 2nd. M. Vries has not cured a single one of the cancers that we have submitted to his treatment; 3rd. All the cancer patients of our hospital have become worse and worse,—many of them will soon die; 4th. M. Vries has never cured a single case of cancer."

We have thus another proof that charlatanism cannot last; the truth will out at last. When asked whether, if after six months' experimentation the patients were no better, he would declare that he was mistaken, "the Black Doctor" answered—"No! if no cure cancer in de hospital, me cure dem in de town."

M. Liais addresses to Paris observations of Donati's comet made in the southern hemisphere. The celestial wanderer became visible at Pernambuco and Alagoas, during the early days of October. The numerous storms at Rio Janeiro prevented M. Liais observing it until the 21st of October. About this date the comet presented a great uniformity in the intensity of the light of its tail, which had only become a little fainter, perhaps, at the borders. The length of the tail was 21 degrees on the 21st October, and became gradually less and less until the 3rd of December, when its length was only 55 minutes. It disappeared completely, from the 3rd to the 6th December. A minute conical tail appeared about to form on the 8th, but disappeared on the 10th. The nucleus at this period appeared less concentrated towards the centre, and soon the comet became invisible to the naked eye. M. Liais, who had followed it from Paris, saw this remarkable comet for the last time, at Rio Janeiro, on the 23rd of January, 1859.

During the whole period of its visit to our part of the universe, the light of the tail and of the nucleus was found to be polarised, the plane of polarisation passing through the sun. According to M. Liais' calculations, the volume of the comet decreased slightly from the 21st of October to the 6th of December, and augmented after the disappearance of the tail, from the 6th December. The whole of the comet's light was found to be borrowed or reflected from the sun. This light was composed of two parts: the one regularly reflected and polarised; the other irregularly reflected and giving no polarisation. The latter was seen to decrease much faster than the first, which seems to indicate that a certain quantity of the nebulous matter was dissolved or deposited as the comet got farther from the sun.

Dr. Phipson has communicated an interesting paper to the Academy of Sciences, at Paris, on the action of *Santonine* on sight. Santonine is a white crystalline substance extracted from *Artemisia Santonica*. It affects the sight of those who take a certain dose of it, in a very singular manner: after a few hours, external objects appear coloured greenish yellow, or even green, blue, orange, red, &c., according to the dose and the person who takes it. There has been some discussion as to how this remarkable effect is produced. Some have affirmed that Santonine produces a sort of jaundice, during which the serum of the blood is tinted, and, circulating through the vessels of the eye, produces *coloured sight*. Others state that Santonine has a peculiar action upon the retina itself. Dr. Phipson has made experiments upon himself, with a view of throwing more light upon this obscure question. He experienced the same effects described by other authors, viz.: all *white* objects, and the *fire*, the *gas-light*, &c., appeared of a fine greenish orange tint. He has proved that Santonine, when introduced into the system, is oxydised and transformed into a new substance, which he calls *Santoneine*. This substance, which Dr. Phipson has produced artificially, in pretty greenish yellow crystals, soluble in alcohol, circulates with the blood, colours sight by passing through the vessels of the retina, and is finally expulsed from the body.

M. Miahle, a distinguished pharmacien of Paris, had already observed facts similar to those now brought forward by Dr. Phipson.

PHOTOGRAPHY IN ALGERIA.

To the Editor of the "Photographic News."

My dear Sir,—I hope all my letters reach you eventually. I don't expect them to reach you in very regular succession, and no doubt you sometimes get two or three at one time; but still I think the post-office at Algiers is very well managed, and when my letters once reach there, I have no fear of their reaching you—the great difficulty is to ensure their reaching that place. I am obliged to trust them to an

Arab who is going either to that place or Bone, and, as I am obliged to pay him beforehand, I feel sure that if he had a motive for stopping fifty miles this side of either of those places, he would use my letters to light his pipe without the smallest hesitation, and tell me when he comes back that he had posted them, and back up his statement by as many circumstances as a witness at the Old Bailey in proving an *alibi*. As to getting any letters that may be lying for me at the post-office at the former place, that seems out of the question. One man tells me that the officials refuse to give them up unless I apply for them in person; and a second, who has just now returned thence, says there are none, which is just what he would say if he had got them and lost them. Photographers, who confine their operations to that which is, all things considered, the prettiest and most interesting country in the world, can hardly imagine the anxiety with which one looks forward for letters when one is far away from home and friends—living among a race of people with whom it is difficult to converse, and who are incapable of reasoning on any subject which does not fall within the experience of their everyday life, and these subjects are very limited in number. The Arabs, among whom I am now living, are grossly ignorant, and yet I firmly believe that they entertain the idea that what I know is as nothing compared to the profundity of their wisdom. Their conceit is quite ludicrous, and arises from their fanatical belief that the man who is not a Mahommedan must be little better than a Jew, whom they consider to be little above the level of their dogs in point of intellect, and infinitely below them as regards usefulness. The horror which the House of Peers would feel at finding a Jew sitting among them in a legislative capacity, would be as nothing compared to what these people would feel if a member of the tribe of Israel were to take his seat among them in private life. Even Hamed, who is my inseparable companion, and a man of inquiring mind, retains many of the prejudices of his countrymen, notwithstanding that I have laboured to show him that there are many things true which were never dreamt of in his philosophy. Any of your readers who may come out here would do well to remember what I have said of the Arab character, or else they may be annoyed by the assumption of superiority which the Arabs affect over white men who are such fools as not to believe in Mahomet. I would advise no photographer to come here alone, if he can help it, but to have a friend with him to assist him in passing away the time. I have been extremely fortunate in meeting with Hamed, who happens to be an agreeable companion, as well as a good man to have for a friend, on account of his influential position among people who would not have minded cutting my throat, when I first came among them, for the sake of my property. My position is altered now; I have joined them in excursions among the mountains against lions and tiger-cats—which latter, by the way, they seem to regard with much greater fear than the lion; probably on account of their being more frequently met with during the day, when, as a rule, the lion is crouching in his lair. I have just returned from an excursion among the mountains, which lasted five days. Our party was a strong one; beside myself and Hamed, there were twelve or thirteen Arabs, four or five of whom were mounted, the rest running along on foot, and keeping up with us without any difficulty. One of them led a horse loaded with my tent and camera, and a couple of my canvas water bottles, and a very queer object he looked—so much so, that the sheikh suggested that we should place him in the vanguard, as he was certain that, in the event of our meeting a lion, he was sure that he would run away from such a strange-looking animal; but I did not listen to the suggestion. I need scarcely say that we were all armed, though some of us carried guns which looked to me as if they would be far more dangerous to those who fired them than to the object fired at. We started at daybreak one morning, and reached the range of mountains we proposed to visit about five hours afterwards, when we halted to get something to eat. Our larder was not very plentifully supplied, nor with any great luxuries; but any photographers who may have injured their digestions by frequent dining with the Lord Mayor, will be certain to have them set right if they come out here and take up a residence with an Arab. Rice, mutton, and dates is the staple of their consumption, with unleavened bread and butter, and in our case with the addition of tea and coffee: but abundance of exercise, and the pure, clear atmosphere of the mountains, give one an appetite for anything; and while on this excursion I dined one day off lion, and with immense relish too, though the flavour is not precisely the same as that of "the roast beef of Old England."

I hope your readers are not tired of lion stories, for the fact is, that there is little else to write about from here. It forms the staple of the tales told by the Arabs around the evening fire; and if I were to believe all I hear on this subject, I should pronounce the lion to be the most ferocious, cunning, and blood-thirsty animal in existence. Not only do they say that the lion can fascinate, or, as I suppose electro-biologists would say, mesmerise, unlucky individuals who may come in his way, but he can do something far more wonderful: he can distinguish between a thief and an honest man; or perhaps, where all are thieves, it would be more correct to say, he makes a distinction between a greater or lesser thief. They tell me that the lion never attacks a man who is naked, and that, for that reason, those who are on a thievish excursion always divest themselves of their clothing. He respects their persons because they are engaged in an occupation similar to his own; but if a man retains as much of his clothing as is worn by a coolie in India, the lion looks upon him as one who is not heart and soul in his business—with much the same sort of feeling, in fact, as we at home regard a man who rows in gloves. He walks round and round him, playfully whisking his tale in his face, varying his amusement by occasionally stopping in front of him, drawing back his lips so as to show his enormous teeth, and uttering the most terrific roars. Farther on he will, perhaps, leave him and strike off into the wood; his wretched victim hurries along thinking that his tormentor has left him altogether—but all of a sudden the lion will spring from behind a rock, or an angle in the road, and with a stroke of his paw send him reeling backwards, precisely as we have seen a cat play with a mouse. When he is tired of this amusement he ends the dreadful anxiety of his victim by killing him outright. The man who is dressed in the ordinary way does not obtain even this horrible reprieve, for the lion lays hold of him and destroys him at once. If a party of naked Arabs are returning with their plunder and they meet with a lion, they wait respectfully until the animal has seized the beast to which he may take a fancy, and then continue their journey homewards, waiting until they think they are beyond his hearing before they venture to call him the most opprobrious names, for they entertain an opinion that the lion understands what is said to him.

We were rather fortunate our first day, for we shot three hares and some birds, which was a change of diet appreciated by all of us. I had no work to do, for nothing had presented itself of sufficient interest to induce me to unpack my apparatus during the day, so I had merely to assist in fixing my tent, and then we all sat down round an enormous fire, lighted as much for the purpose of keeping wild beasts off as for the sake of warmth, though it was very agreeable on the latter account, for it felt very cold to me, after I had dismounted and sat down for a little while.

Our encampment presented a very picturesque appearance. On one side of the enormous fire, that roared and sparkled in a way to frighten our horses at first, was my tent, in which myself and the sheikh were very snugly ensconced, and around which the Arabs were lying, or sitting cross-legged, furbishing their old guns, and afterwards loading them with as much care as if an attack was imminent, though our number rendered this very unlikely. The horses were brought within the circle of light, and not only fastened to pegs driven in the ground, but hobbled, so that they got very little to eat beside what they were able to get between the time of our halting and its getting dark; this was done with a view to protecting them from lions and thieves, and their safety was further cared for by the Arabs, whose duty it was to act, in turn, as sentinels during the night.

After our meal was finished, the pipes were brought out, but the natives artfully waited to see the extent to which my liberality would reach before they produced their own tobacco; and as nothing is lost by kindness, and I often require assistance, which they might refuse to render me, I find it advantageous, after Hamed and I have filled our pipes, to abandon the remainder of the packet to them to divide as they please. Apart from the pleasure one always feels in doing a kind action, this is really a very inexpensive way of securing the good offices of these half-savage Arabs, for tobacco is grown in very large quantities in this country, on account of the French Government, and may be bought at a low rate.

[The remainder of our correspondent's letter will be given in our next.]

THE STEREOSCOPIC EXCHANGE CLUB—THE COLLODIO-ALBUMEN PROCESS—GOLD TONING.

Honoured Sir,—In the "Photographic News" of March the 18th appeared a proposal about the interchanging of stereograms between amateurs. I think this a very happy idea, and take the liberty of asking you to put my name upon the list. You propose to send them duly mounted, in fact, ready for the stereoscope. I am afraid, however, that in this way the carriage will be rather high; and if any of your countrymen or subscribers would favour me with an exchange, I should prefer to receive the stereogram not mounted, in an ordinary envelope, and a few words about the exposure, lens, process, kind of paper, &c., not, of course, a full grown letter, but only a few indications on a slip of paper. I think this would constitute a real *enseignement mutuel*, and be of the greatest advantage to all amateurs, whereas the mounting might be done by every photographer himself, for I suppose that nobody is without his passe-partouts and mounts.

The eulogium you bestowed on Mr. Sidebotham's collodio-albumen process has induced me to give it a trial; and I am exceedingly happy to have an opportunity of thanking this gentleman for his invaluable information. I have nearly tried all the dry collodion processes, and obtained only second-rate results, whilst I very frequently had the misfortune of seeing my film washed away, not to speak of other accidents quite as disagreeable. When due attention is paid, success is unavoidable to those who follow Mr. S.'s plan. I prepared twenty plates, and kept them for a week; I exposed them from three to five minutes with a single lens, the weather being rather cloudy, even rainy, and not one of them failed, whilst some gave me really superior results. However, I substituted the ammonium for the potassium salts, as my first experiments gave me some very small holes, which I ascribe to the latter crystallising. A little more free iodine would, perhaps, cure this defect. However, I have still to overcome a little inequality in the development, especially in the skies, and suppose that this might be done either by *immersing* the plates in the developing liquid until all the details are out, or by drying them after the second sensitising bath, over a vessel with steaming water.

Do any of your readers know, perhaps, a compound suitable for stopping out the skies *after* the plates have been varnished? I have been trying a mixture of gum arabic with bichromate of potassa (the glass having been previously heated), but this does not answer very well, as the liquid in drying forms little mounts, and spoils the ultimate results.

The fixing and toning bath at vol. i. p. 86 answer very well, only I suppose that the chloride of gold sold in England must be far stronger than the article I can get here. Your correspondent's formula is about 1 part chloride of gold to 3,000 of water. I left my pictures for *hours* in this solution, but the bronzed parts did not change colour, and, even with a toning bath three times as strong, it took an hour and upwards to have the desired effect. With an acid gold bath (1 : 1000) the change takes place in a few seconds, often instantaneously, which I think a great fault, as the best picture may be often spoilt irretrievably. I make my solution in the proportion of 1 grain gold to 100 water, and add the carbonate of soda, as it is easy afterwards to dilute it to the desired strength. The colour from pure yellow changes to green; is this right? I suppose it is, since the addition of a few drops of hydrochloric acid (of course by way of experiment) renders even to a very weak solution its bright yellow colour; therefore I conclude that my gold is deficient in chloride, and either more of it should be used, or less carbonate of soda be added. Would your correspondent oblige me by stating in which way the chloride of gold he uses is prepared.—I have the honour to remain, yours obediently,

Herman L. T. Haakman.

Amsterdam, March 29th, 1859.

[1. We are still of opinion that it would be found more generally advantageous if our suggestions of having the stereograms always mounted were strictly adhered to. The expense of postage (by the book post) would not thereby be increased in this country, and we do not imagine, after what we have said on the subject, that the Post-office authorities will throw unnecessary difficulties in the way of stereograms circulating by the book post on the Continent. Of course it will be always open to our correspondents to make what private arrangements they please with each other on this subject; but in the absence of such mutual understanding, much inconvenience will be saved by an adherence to our suggestions. 2. Perhaps the enlarged instructions on printing positives, given by our correspondent O, in vol. ii. p. 15. A recipe for making chloride of gold will be found at vol. i. p. 216.—Ed.]

PHOTOGRAPHS IN NATURAL COLOURS.

Dear Sir,—Does your correspondent, who says that he has discovered a method of fixing the natural colours in a photographic picture, inform you whether he has carried his experiments so far as to be able to produce something like certain results? I have no doubt many who have practised the art of photography have been charmed at times by seeing the natural colours produced in their pictures, but have been disappointed at finding they have all disappeared on drying. I have noticed the effect in a great many portraits I have taken in the open air with a white sheet placed between the sun and the sitter, the exposure almost instantaneous, and the picture developed with weak pyrogallic and acetic acids. In one instance only have the natural colours remained, and they are rather veiled, as if the face was reflected in a black mirror. I think it probable that the pure white light giving great brilliancy to the colours has something to do with producing the effect, but I consider the production of the colours so much a matter of chance, as to be of little or no value to photography. If, however, your correspondent has discovered some method attended with *certain* results, it is a most valuable discovery.—I remain, dear sir, yours truly,

Reigate, 24th March, 1859. Thomas Barrett.

Arsenical Paper Hangings.—The question whether paper coloured green with arseniate of copper (Scheele's green), used in papering the walls of rooms, gives off poisonous emanations is one which recent experiments have decided in the affirmative; and this, too, in quantities which render its use positively dangerous. At the same time the beauty of the colour, and the relief it affords to the eyes, makes the continued use of this coloured paper desirable. A very simple means of preventing these arsenical emanations may be found in the use of varnish; this, and the coating of size which precedes it, effectually isolating it from contact with the atmosphere.

Photographic Societies.

London Photographic Society.—C. B. Vignoles, Esq., F.R.S., in the chair.

After the minutes of the proceedings at the last meeting of the Society had been read, the Secretary read a list of the members which the council, in accordance with the request of Mr. Hardwich, had nominated to test the relative merits of the various kinds of collodion to be submitted to them by those makers who chose to reveal the formulæ employed by them in its manufacture.

Mr. Malone suggested that it was advisable that the commission should consist of others than merely practical photographers, and that considering how important it was that experienced chemists should be concerned in the examination of a compound containing such substances as bromine and iodine, he urged that the names of Mr. Maskelyne, Mr. Heisch, and Mr. Spiller should be added to the list.

Mr. Hardwich had no objection to the addition of the names of gentlemen so competent as those suggested by Mr. Malone, but appeared to think that it was more a question for practical photographers to decide. He thought that it would be very objectionable for the Society to be made the medium of puffing any particular maker, and that the commission should consider and publish the result obtained by a particular formula, without publishing the name of the maker.

Mr. Le Neve Foster thought the addition of the names proposed was not a matter which the members of the Society were competent to enter upon. It was the duty of the Council to decide as to the gentlemen who should form the commission.

The Chairman took the same view of the matter, but expressed his opinion that the Council would be perfectly willing to add the names proposed by Mr. Malone, though more as a matter of form than otherwise; the Society could not consider that now.

The Secretary read a communication from a Mr. Sutton, describing a species of vessel which he termed a schooner, which he considered would be a capital thing for photographers on an excursion, who might thus carry about with them, not only chemicals, but prog and other *et ceteras;* landing when they felt disposed to take a view of any particular spot. This exceedingly ingenious machine (which we may observe, in parenthesis, resembled a greatly elongated washing tub, with a piece of wood nailed to the bottom), would draw from one to two feet and a half of water—accordingly, we presume, to the stoutness of the photographer and the quantity of *et ceteras* he carried with him.

The reading of this communication was followed by a general titter; after which

The Secretary read a letter from Capt. Kater, referring to an examination he had made of the relative merits of the Voigtlander and Petzval lenses. We need not give his letter in full, as the conclusions at which he had arrived were precisely the same as those we published as the result of our own observations in our last number.

The Chairman invited M. Voigtlander, who was present, to make any remarks on the subject he felt disposed, but that gentleman very judiciously declined to avail himself of the invitation, whereupon

Mr. Mayall rose, and observed that he had long since tested the relative merits of the Voigtlander and Petzval lenses—that he had carefully measured their curves, and found them the same;—that he had subjected them to the same tests as that to which they had been subjected in our presence, and had arrived at the same conclusions. He proceeded to point out the importance to photographers of being informed as to the best description of lens for photographic purposes, and protested in energetic terms against the paper reporting the proceedings of the Society being made the vehicle of advertising any particular lens (alluding, we presume, to the so-called architectural view lens), and ended by moving the appointment of a committee to test the various lenses manufactured, with a view to coming to a decision as to which was the best for photographic operations.

At the conclusion of Mr. Mayall's speech, which was received with marks of approbation, a dead silence fell upon the meeting, which lasted so long that it seemed as if it had come to a premature end, until, with a view to reviving the discussion, the Chairman called upon Mr. Fenton by name, and begged him to offer any observations that might occur to him on the subject of Mr. Mayall's proposition.

Mr. Fenton had hoped that, as he was present in a private capacity, he would have been suffered to enjoy his *otium* (he was too modest to add *cum dignitate*), for that evening, but as he had been called upon to speak on this subject, he would do so. He then proceeded to argue from particulars to generalities;—that the subjection of two or more lenses to certain—and precisely identical—tests, with a uniformly superior result in favour of one particular lens, was no proof of the superiority of that lens over the other; and that to arrive at a correct conclusion on the subject, it would be a good plan for a certain number of members to test the lens under different circumstances during the summer, and, as we understood him to suggest, that the results should be compared at the end of the season. He was in favour of a committee being selected for the purpose as Mr. Mayall had suggested, and, after a few more remarks, resumed his seat amid very general applause, accorded, we presume, to the manner rather than the matter of his speech.

Mr. Le Neve Foster deprecated the time of the meeting being taken up by these discussions, which referred to a matter pertaining especially to the province of the Council. This body, he contended, was appointed to conduct the affairs of the Society, and, therefore, it was for the Council to decide what changes should be made in its management. If the Society was dissatisfied with the manner in which the members of the Council did their work, the proper course of proceeding would be to call a special meeting and dismiss them, and appoint others in their place; but, he could not consent to the society taking this matter into its own hands; and if these sort of discussions continued, he was afraid it would degenerate into a kind of debating club. The Council was perfectly willing to listen to the suggestions of any member; it had no desire to tyrannise over the Society, and anything that might be suggested would meet with its attentive consideration.

Mr. Malone supported the proposition of Mr. Mayall. He was aware that it was not the custom of scientific societies in this country to express an opinion, but he thought there was a precedent in the records of the Photographic Society for the appointment of such a committee as that asked for. He certainly thought that the time had arrived for adopting the mode of proceeding on this point followed by the *Académie des Sciences,* and the French Photographic Society. He made various other remarks to the same effect; in the course of which he was once or twice interrupted by the Chairman on trivial points.

The Chairman was of opinion that the appointment of such a committee as that asked for was not within the province of the Society; it rested with the Council, by whom such matters must be decided. He had no doubt of the entire willingness of that body to consider any matter in which the Society was interested; and he might mention that the subject had been discussed in its bosom on that very evening just previous to the meeting.

Mr. Mayall did not care from whom the committee emanated provided it was appointed; he, therefore, withdrew his motion, and left it in the hands of the Council.

Mr. Hardwich read a paper which he had drawn up hastily, in consequence of his hearing that a gentleman who was to have been present to read a communication was unavoidably absent through illness. His paper referred to some experiments he had made, in conjunction with Major Russell, as to the availability of one kind of collodion for both the wet and dry process. He did not find that the superiority claimed for a powdery kind of collodion in the dry process was borne out by experiment; on the contrary, the best results were obtained by using a hard contractile collodion. A plan he had tried for preparing plates for this process was, first coating the plate with a solution of India rubber, dissolved in benzol—which saved much trouble in cleaning the plate—and then pouring on the collodion, sensitising, and coating in the ordinary way, with albumen.

Mr. Mayall did not approve of Mr. Hardwich's suggestions. He thought that the object of photographers should be to simplify and not to complicate processes. That another dry process was not required, there being already so many that it would take the whole of the summer season to test them, if one wished to ascertain which was the best. He had seen pictures produced by a gentleman, by means of the honey process, which were the best he had ever seen. For his own part he thought that a suggestion he had himself made to the Society some years ago, to adopt the use of the plain albumen process alone, would, eventually, be found to be the best, especially if the sensitiveness of the film was increased by exposing it to the vapour of iodine after sensitising. This gentleman's speech was interspersed with sundry small (very small) jokes, which relieved the mournful tediousness of the evening, and gave some of the least grave among the members an opportunity of laughing.

Mr. Malone did not in the least agree with Mr. Mayall, as to the capabilities of albumen. As to the employment of iodine vapour, he himself was the first to suggest its employment, and it could not be supposed that he was ignorant of what it was capable of accomplishing; but for all that, its sensitiveness was not at all comparable to albumen on collodion.

The discussion was continued for some little time longer in a languid and uninteresting manner, and soon died away altogether; upon which, after renewing the efforts he had several times made during the evening to animate the conversation,

The Chairman pronounced the meeting adjourned.

Photographic Notes and Queries.

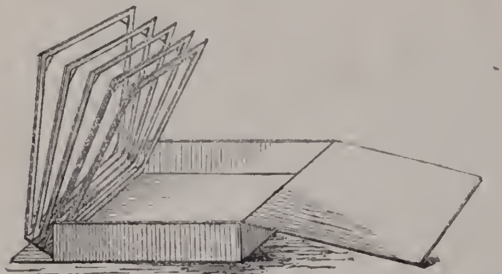
◆

IMPROVED PLATE BOX.

Sir,—A much simpler form of plate box than the one described by Euphos, in a recent number, but on the same principle, has long been in use.

A number of frames made of thin deal, similar to the frames of schoolboys' slates, are hinged together, so as to open like a book; a piece of silver wire, or better still, a piece of wood bevelled, so that only the extreme corners of the glass plates will come in actual contact, is inserted in the four corners of each frame. The bevelled side of the slip of wood is to be on what I will call the back of the slide, not the side on which the plate rests. The plate is laid with the collodion side upwards, so that the plain side rests on the four slips of wood, and when the next frame is laid upon one slide, the side of the plate on which the picture is comes in contact with the four bevelled sides of the slide next above it, and is thus kept from moving.

The *book* of frames is ingeniously enclosed in a deal box or case, in such a way that upon lifting the lid you may raise one or any number of the slides, and see the negative without touching or displacing any.



To remove a plate, it is only necessary to gently lift it at the back with one hand, so as to raise a corner for the other hand to lay hold by.

A box containing any number of these frames is not larger or heavier than the ordinary plate boxes. It was originally constructed by a clergyman, and the late Mr. Archer afterwards adopted it; and I have no doubt that it may be procured of the gentleman to whom Mrs. Archer made over all Mr. Archer's business.

The lowest of the frames is hinged to the bottom of the box or case in the same direction as all the frames are hinged to each other. The side of the box next to the hinged sides of the frames must open so as to allow the book to open; the top lid also opens so that when the box is shut the top and side come together, and the one having a hook and the other an eye, the box is secured firm. Instead of hinging the frames together with brass hinges, they may all be cemented and screwed to a piece of flexible leather.

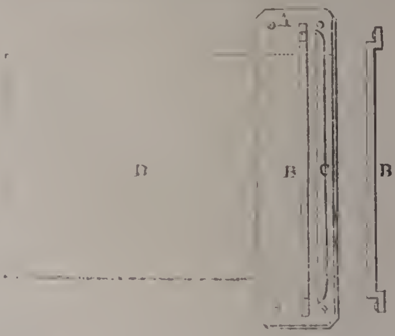
I have found that by cutting the grooves in the ordinary glass plate box in the shape of a V, the risk of tearing the collodion film is almost entirely removed—especially if the box be always held sideways while putting in the glasses, so that the back edges only rub against the groove.

The accompanying drawing will, I hope, explain the construction.

H. E. N.

VICE FOR ROUGHENING GLASS.

Sir,—I have invented, and have found answer its intended purpose well, the following simple contrivance for quickly grinding the edges of glass plates for negatives, which is at the service of any of your numerous readers.



A, a piece of wood about 1 inch thick, and long as the longest side of the plate, screwed down to a bench to keep it steady. B, a small bar of cast iron, under which the glass is placed to be ground. C, another bar of iron or wood, that serves as a stop, giving the width of the glass to be ground.

By holding the plate of glass in the left hand steady against the stop C, then putting a little coarse emery and water between B and C, and giving a few smart rubs with a small piece of plate glass, held in the right hand, the glass will be most effectually ground in a short time.

Thomas Gulliver.

HINTS ON THE COLLODION PROCESS.

Sir,—The photographic working season being at hand, many failures will annoy beginners; so if you think the accompanying hints on the manipulating collodion plates—which I have compiled—will lessen their troubles, I shall be glad. If defects still arise, and these hints have been well followed, I think they may safely say it is not from the manipulatory division, but from chemicals, &c.

See that your camera is clean inside, the lens polished, and your chosen site the best.

See that your glass is well and truly clean.

Remember to wipe your collodion bottle free from crusts.

In coating with collodion do not pause, do not pour on too little nor too much, do not cause spluttering by holding the bottle too high.

Rock the plate *gently*.

When ready, immerse in the bath without a pause, and do not move it for a minute, then lift it in and out quickly, and let it stay till done.

Before putting it in the back, drain on *clean* blotting paper.

Do not let the back be in the light without a thick covering, nor let its vertical position be altered, nor shake the camera in uncapping; shut the slide *gently*.

Of two faults, don't under-expose.

See that your developing glass is clean; use enough solution to cover the plate easily, but, if possible, do not spill any.

Do not let any of the yellow iodide remain; and be sure all the fixing solution is washed off.

If the picture is faulty, find out why it is so before you try again.

Wash your hands constantly in plenty of pure water, avoiding soap. H. S. I.

NOTES ON POSITIVE PRINTING.

Sir,—In the paper process which I follow, I am extremely fond of using spirits of wine. Certain it is, that if the nitrate bath contain a small quantity, the papers will keep very much longer; and, it is quite a common thing with me to use papers that have been prepared a fortnight or three weeks.

With your permission, I will give you an account of the way I manage; and, if some of your readers would try it, they would be able to judge of its value for themselves.

Nitrate bath.—Nitrate silver, 1 oz.; distilled water, 8 ozs.; spirits wine, 1 oz.: float ordinary salted or albumenised paper on for five minutes, and pin up to dry.

After printing, immerse at once in the

Toning bath.—Hyposulphite of soda, 4 ozs.; water, 12 ozs.; spirits wine, 1 oz.: and, when dissolved, add 24 grains chloride gold, previously dissolved in 1 oz. of spirits of wine.

Immerse the print in this, turning it over now and then to prevent it from toning unevenly, and in about a quarter of an hour or thereabouts it will be sufficiently toned; then take it out, and rinse it well under a tap, and afterwards let it soak for about two hours, although, by the way, if I am in a hurry, I don't soak it at all, only rinsing it a little more. This done, dry it between pieces of blotting paper.

As you must perceive, this is very simple, requiring no hypo. bath afterwards; for, it is my opinion, that when the paper remains so long in the hypo., it becomes rotten, and this may, perhaps, be one cause of fading. I would merely state, in conclusion, that I have used this process for at least two years and a half, and am not exaggerating in the least, when I say, *I have not had a single proof fade in the whole of that period.* Thomas Clark.

COPYRIGHT IN PHOTOGRAPHS.

Sir,—Can you inform me whether stereoscopic pictures with descriptions at the back can be entered at Stationers' Hall, and whether an action could be brought for piracy with a fair chance of recovery?

In the shop windows of London are so many inferior representations of good pictures, that the natural inference is that they are *copies* only. Perhaps some of your readers could give examples of this species of robbery. This publicity might, I think, have a good effect. But surely some protection should be afforded by the legislature against this species of plunder? Beta.

[A stereogram may readily be entered at Stationers' Hall; but on inquiry there we were distinctly told by the gentleman who did us the favour to receive our money, that he could give no opinion as to the utility of such a proceeding. On referring to the Acts of Parliament on the subject, we are of opinion that an action at law against any one for a glaring case of piracy would result in a verdict for the plaintiff. The whole case of copyright in photographs is, however, in a very unsatisfactory state, and attempts are being made in more than one quarter to procure an alteration in the existing law. We will at once acquaint our readers with any steps which may be likely to interest them.—Ed.]

IMPROVED DIPPER.

Sir,—I think the best kind of dipper is that consisting of a strip of glass with a piece of gutta percha lapped under the bottom, to break concussion, and it might be continued up the back of the glass to prevent it from breakage in travelling. James G. Dear.

THE "NEW ACTION OF LIGHT."

Sir,—I enclose—in yellow paper, for it is not fixed—a somewhat curious fern-print, which I have just found accidentally, under the following circumstances:—In looking over some white filter-paper, in a drawer containing also several books with portions of ferns between their leaves, I discovered the specimen in question; the drawer had been used, about six weeks ago, for keeping positive sensitised papers in, and several pieces still remained there, while odds and ends of ferns were strewed about.

I have every reason to believe that the filter-paper has *never* been exposed to the solar rays; it was brought home about eight or nine months ago, *at night*, and the contents of the drawer have been in *absolute darkness* for six or, it may be, seven weeks, or just before I had left London. I *know* the sensitised paper (*Canson's albumenised*) was not there *before* that time.

Moreover the temperature of the room during the same period has *never exceeded* 57° Fahrenheit, as I have just ascertained from *two* of my "*Compensation*" *maximum thermometers*, which, it may be necessary to remark, act *without moveable indices*.

On the preceding facts I need not comment—they must be sufficient to show that the specimen enclosed has been produced by the latent actinism emitted from the surface of the filter-paper, which the latter had acquired from *diffused daylight only*. W. L. Scott.

DISCOLOURING THE SILVER BATH.

Sir,—I get many little helps from the "Photographic News," for which I feel grateful. Recently it came to me just in time to save a very valuable silver bath which I had given up as lost. I dropped a black varnished plate into this bath—the varnish being made of bitumen, turpentine, and naphtha—and after this I was not able to get a good picture. I boiled the bath 15 minutes, and it turned almost as black as ink; I then filtered it many times, but it was still black. When I was just giving it up as a bad job, and concluding my bath lost, the newsman walked in with my "News." I at once made it my companion; and I found, on page 291, vol. i., "Discolouring of the Silver Bath, by H. Francis," and I commenced afresh with my bath; I put in 2 ounces of pipe clay, and in half an hour after this my bath was entirely cleared of that black matter. I have just filtered the bath twice, and it is as clear as crystal, and works very well. I respectfully thank you and Mr. H. Francis for this valuable help. John Rowlinson.

TONING POSITIVE PRINTS WITH COPPER.

Sir,—Enclosed are three prints, toned with *copper* instead of gold.

As I believe this process to be new, I subjoin the formula:—

Hyposulphite of soda	4 ounces.
Nitrate of silver	20 grains.
Nitrate of copper	160 grains.
Water	8 ounces.

Dissolve the hypo. in 7 ounces of the water; the silver in ½ ounce; and the copper salt in the remaining ½ ounce. Add the copper solution gradually to the hypo. solution, then the silver solution in the same way. P. Δ.

SENSITIVE PLATES AND THE CUSTOM HOUSE.

Sir,—I trust before long you will have some replies to the letters of W. W., p. 11, and Mr. Nicholson, p. 20 of this volume, as these letters express a want long felt in the amateur photographic world. Would you kindly insert a line, asking for the experience of any photographers who may have passed through any custom houses, English and foreign, with sensitive plates or papers in their possession—how they managed not to have their sensitive tablets spoilt by the examination of the officers? J. N.

FADING OF GLASS TRANSPARENCIES.

Sir,—Those gentlemen who may have purchased positives on glass of scenes in Switzerland, Germany, Austria, and other countries, some three years ago, as I did, will learn, with sorrow, that out of thirty glass positives nearly half of them are gradually "fading away." "The Castle of Heidelberg," "The Glacier of Tacconay," "Glacier of Rosenlau," &c., being among the worst. Silverpen.

ANSWERS TO MINOR QUERIES.

Cleaning Dirty Bottles.—*H. S. I.* The way to clean a dirty bottle must, in great measure, depend upon the kind of impurity in it. Generally speaking, if the operator knows what has been in the bottle, a little exercise of his chemical knowledge will suggest an appropriate solvent; thus:—If the bottle has a deposit on it arising from hard water being left in it, rinsing out with dilute hydrochloric acid will immediately dissolve off the carbonate or sulphate of lime of which the crust consists, whereas it would require long continued hard rubbing to effect the same mechanically. Stains of iron, arising from positive developing solution or perchloride of iron having stood in the bottle, may be likewise removed by the same solvent; in this case, however, the acid must be used strong and slightly warm, as the deposit is more difficult to remove. Other impurities, such as oil or grease, require an alkali; thus, to clean a Florence flask, place in it a couple of ounces of hot water and half an ounce of common washing soda, and boil for a few minutes, shaking round so that all parts of the inner surface of the flask are brought in contact with the soda. Other kinds of impurity require special solvents to loosen them. Methylated spirits of wine and pyroligneous spirit (wood naphtha), will also be found useful; the latter especially, in cleaning out bottles which have contained collodion, and have a film dried on the inside, as it is a good solvent for pyroxyline; black varnish is also readily dissolved by this liquid. It is, however, unadvisable in many cases to resort to *chemical* methods of cleaning bottles until mechanical ones have been tried and failed, as even, if the latter do not perfectly succeed, they frequently leave very little to be effected by the solvent, thus avoiding unnecessary expense, for the value of a few minutes' labour is less than that of a chemical solvent; and, therefore, we advise the following plan to be tried first, and then if the dirt be very refractory, it can be treated chemically:—About half fill the bottle with pieces of filtering paper, and then put in a little coarse sand or fine gravel (about an ounce for a six ounce bottle), and just sufficient water to make the whole assume the consistency of paste when shaken up for some time. Now introduce the cork or stopper, and shake it violently for some minutes, turning the bottle round so as to make sure that all parts have been exposed to the friction; then add water and rinse it out, and in nine cases out of ten the bottle will be quite clean.

Chloride of Gold.—*F. S. W.* has some chloride of gold, which, although it has been kept in a well-stoppered bottle in a warm room, has become quite liquid, and asks what can be done with it. The chloride being very deliquescent has merely absorbed water from the atmosphere *in spite* of the stopper (for no stoppered bottles are perfectly secure). The salt can easily be obtained again in the solid state by drawing off the water by heat, or it would be, perhaps, preferable, if the original weight of the chloride of gold were known, to add more water, until the strength is such that one fluid drachm contains one grain of chloride. Any desired quantity can then be measured out for use, and with greater convenience than if it were in the solid state.

Insensitive Patches on Waxed Paper Negatives.—*Aliquis.* The cause of the patches of insensitiveness occurring on your sheets of waxed paper is, that the sensitising solution has not remained sufficiently long on those parts, and there not having been the required excess of nitrate of silver in addition to the iodide of silver. The image was not impressed during exposure, and consequently could not develope. The negative looks as if it had been made sensitive by a small quantity of aceto-nitrate of silver on a glass plate, instead of employing a large quantity in a dish; the latter plan should always be adopted, as by the other method such patches are liable to occur.

THE STEREOSCOPIC EXCHANGE CLUB.

The following gentlemen, having approved of the proposition for exchanging stereoscopic pictures which we have recently made, and agreeing to the regulations contained in the "Photographic News," vol. ii. p. 48, have forwarded to us their names and addresses for insertion:—J. W. Love, lecturer, Stewarton, Ayrshire, Scotland.—J. B. Robinson, Manchester and Liverpool District Bank, Macclesfield.—H. H. Allen, 2, Leadenhall-street, London. (Two or more pictures.)—A. F. Stafford, 2, Alderson-street, South Shields. (Two or more pictures.)—Alex. Nicholson, Dun-Edin Villa, Highbury New Park, London.—J. E. Coward, Twyford-place, Tiverton, Devon.—Thomas Clark, 2, Ordnance-terrace, Shooter's-hill.—H. Haakman, Amsterdam.—Thos. A. Jeffrey, Cheltenham.—J. H. Jones, 12, Williams-street, Swansea.—Rev. J. I. Dredge, Monmouth. (300 pictures.)—W. J. Skelton, Grimsby.—John Rookledge, Easingwold. (Two or more pictures.)—J. G. Dear, Baldock.—W. Brooks Reynolds, The Elms, Farringdon, Berks.—Dr. Towers, Hertford.—J. C. Twyman, 65, High-street, Ramsgate.—H. Hawker, Menheniot, Liskeard, Cornwall.—Count Wengierski, Osborne House, West Malvern.—Louis D'Elboux, Freemantle, Southampton.—Henry Bath, Longlands, Swansea.—J. W. G. Gutch, 16, Upper Victoria-place, Clifton.—H. Pain, Oak-hill, Surbiton, Kingston-on-Thames.—Wm. Stonehouse, 4, Abbey-terrace, Westcliff, Whitby.—Capt. Baxter, Mancetter Manor, Atherstone. (200 pictures.)—J. B. Leech, 10, Joynson-street, Bury New Road, Manchester. (Three pictures.)—Boughton Kingdon, Hix's Field, Exeter.—F. Lewellen, 5, Great Western-terrace, Westbourne Park-road.—G. Sheldon, Compton, Petersfield.—J. S. Overton, Crowle.—H. W. Loof, Bath-square, Tonbridge Wells. (Five or Six dozen pictures.)—J. T. Taylor, 81, South Bridge, Edinburgh.—C. Thomas, 61, White Lion-street, Pentonville, N. (Twelve pictures.)—George Restall, Payton-street, Stratford-on-Avon. (Two or more pictures.)—George Crabbe, Kirkaldy.—John Sang, Kirkaldy.—J. Heywood, 2, Willow-terrace, Moss-side, Manchester.

TO CORRESPONDENTS.

The Stereoscopic Exchange Club.—We are indebted to several gentlemen for some valuable suggestions, which we shall carefully preserve, and, possibly, may avail ourselves of on a future occasion. At present we think that it would not be advisable to make any alterations in the rules we have laid down, until we find how the plan works as at present constituted.

Nunc Aut Nunquam.—Several minutes' exposure will be required for obtaining photographs of microscopic objects, if you employ no stronger light than ordinary daylight without sun.

Captain G. N. T.—Our correspondent's letter is received, with thanks.

An Amateur (Queries on the albumen process).—1. The sensitising bath will always discolour. So long as it is not very dark it may be used, but when it gets darker than pale sherry, it should be decolourised by any of the methods recommended in our previous numbers. 2. and 3. The iodised albumen will keep for some months if a grain or two of camphor be put into the bottle with it.

J. Bockett.—1. We do not think that your stereograms, being chiefly portraits of private friends, would be such as the members of the club would care about having. 2. Add a few grains of metallic cadmium to your red collodion, and allow it to stand until the colour has nearly or quite gone. Its sensitiveness will be thus in some measure restored, although you will not succeed in making it equal to what it was when new. 3. See notice in another part of the "News."

A Subscriber.—We do not understand what is the particular information for which you ask. No photographer need ask for "a method of taking direct copies on glass of photographic portraits with a half-sized portrait camera."

J. H. J.—We must decline giving an opinion on the safety of taking a bill of exchange from any particular London firm.

Amateur, Atherstone.—Two letters received.

T. P. V.—Provided your lens is good, any good positive collodion ought to take a portrait in four or five seconds in a good light. Amateurs can seldom make collodion on the small scale equal to what can be purchased.

J. P.—1. We prefer an expanding camera with an accordion body. 2. Send a stamped and addressed envelope, and we will communicate with you.

J. F. W.—Your stereograms are excellent. We should much like to know the particulars of the process by which you were enabled to take them. The lenses, also, are very good.

E. S. C.—It is a well-known fact that a sensitive collodion plate, especially if it contains a bromide or has a reducing agent on its surface, will darken slightly if exposed to a strong light, even without development; but this darkening is very slow, and does not proceed far enough to make the fact of practical value.

J. B. Leech.—If your old toning bath is treated as described in our first volume for the reduction of silver residues, the gold will be reduced to the metallic state along with the silver, and the former will be left behind in the form of a dark brown powder, when the metal is treated with nitric acid.

Captain S. S. B.—Your suggestions are received with many thanks, and shall meet with attention.

B. and W.—J. H. J., &c.—It has been considered most advisable that the Stereoscopic Exchange Club should only consist of amateur photographers.

Zetetic.—Received.

Try Again.—Your stereograms are very good; quite up to the average of such productions.

H. W. L.—Received.

T. P. Barkas.—Our correspondent will see, if he refers again to the paragraph, the degree of credit which we attached to it.

Waverley.—The best colour for you to paint the inside work of a glass house will be pale blue. We shall be glad to see your sketch.

G. B.—You added too much carbonate of soda. Filter your bath, and then add acetic acid, drop by drop, until it has a very faint acid reaction. We cannot recommend you a better handbook than our first volume.

A Novice.—1. Spherical aberration may be much diminished, by the employment of a smaller stop in front of the lens. 2. Sensitive calotype paper will not, as a rule, keep good longer than twelve hours. 3 An ordinary magnifying glass in a frame, will be the cheapest substitute for a focussing eye-piece you can have.

Communications declined with thanks:—L. W. H.—Plymouth.—P. N.—Hyposulph.—Portrait.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Harry.—D. T.—Zylo.—T. P. O.—S. W. W.—Philosopher.—W. A. T.—D. R. L.—A. C. Q.—15.—Amateur.—O. F.—S. Johnstone.—Black Ink.

In Type:—Sarnia.—Zingib.—Photos.—S. Highley.—J. W. Fall.—T. P. Barkas.—F. R. E.—A Benefited Reader of the "Photographic News."—W. L.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 2d.

, All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 32.—*April* 15, 1859.

A NEW METHOD OF PHOTOGRAPHY BY MEANS OF THE SOLVENTS OF CELLULOSE.

Such is the title given by M. Van Monkhoven to a memoir presented by him to the Académie des Sciences. It will be remembered that at page 39 of the present volume, we gave a detailed description of what had been done by Dr. Schweitzer and M. Peligot in this matter, and we feel much pleasure in laying before our readers the principal facts which M. Van Monkhoven has obtained in the course of his researches into this subject, reserving the minor details to a future occasion.

The importance of finding a compound which, while it possessed all the advantages of collodion prepared in the ordinary manner, should possess the additional advantage of being *certain* in its results when prepared in a certain manner, will be readily recognised. At present, a photographer may adopt a particular formula for the preparation of collodion, and may obtain an excellent compound; he tries it again with the same care, and under precisely similar circumstances, and the result is a failure; to get it right he finds that he has to add a little more ether, or alcohol, or water. If, then, we find that the new substance gives a film which is in no respect inferior to the collodion now in use, and that it can be prepared with all the precision of a definite chemical compound, it is not difficult to foresee that it will gradually supersede the present uncertain preparation, at least so far as those photographers are concerned who prepare their own collodion; these are not, perhaps, a very numerous class.

M. Van Monkhoven says: "No sooner had I heard of the discovery by Dr. Schweitzer of the ammonio-cupric solvent of cellulose, than I commenced a series of researches with the view of discovering how far it might be rendered useful to photography; and after some weeks of assiduous research, I succeeded in finding a method both easy and cheap.

"The process which at first sight appears most rational, consists in dissolving in the ammonio-cupric solution of cellulose recently precipitated oxide of silver, pouring the liquid on a glass, allowing it to dry, and then submitting it to the action of diluted hydroiodic or hydrobromic acid. In this way there is, certainly, a white film of iodide or bromide of silver found; but all my endeavours to obtain a clear and transparent image were fruitless. Under the film of cellulose, a film of reduced silver was constantly formed, and the superficial image lost. I likewise used the ammoniacal deuto-bromide of copper, the compound ($2\,Cu\,Br. 5\,N\,H_3$) and the ammoniacal iodide $2\,(NH_2). Cu\,I. 3\,HO$, but in vain; a thin brown film of metallic silver was always formed under the picture. I mention this in order to spare persons the trouble of fruitless experiments.

"The methods I found to succeed perfectly were as follows:—

"The ammoniacal solution of deutoxide of copper was prepared either by saturating concentrated ammonia with freshly prepared oxide of copper (obtained by pouring a solution of caustic potash, in slight excess, on the commercial sulphate of copper, and well-washing the precipitate), or, better still, by following M. Peligot's method, which I advise photographers to adopt as being extremely easy. When the solid impurities are perfectly deposited, very white cotton should be dissolved in the liquid, in the proportion of 150 grains of cotton to a *litre* (rather less than a quart). A thick liquid is thus obtained, which can be diluted with a little water, that all the cotton may dissolve. A concentrated and standard solution of iodide of potassium is added, so as to ensure that each quart of the solution of oxide of cuprammonium shall contain from 75 to 150 grains of iodide. This liquid, which keeps perfectly well, is that which is poured on the glass.

"I must not fail to mention that it is on the ammonio-cupric solution that all the beauty of the photographic proof depends. It is necessary that the solution should be thick, flow slowly over the glass, and that the dry film should be perfectly transparent, without possessing in the slightest degree the appearance of ground glass. Let the solution be too weak, and the image will be superficial, without intensity, and may be washed away under a current of water. It is this fact, perhaps, which appears abnormal, that has prevented the earlier application of Dr. Schweitzer's discovery to photography.

"The ammoniacal solution is poured on the glass, and flows over it with considerable facility; and, as it evaporates very slowly, if a part of the glass is not covered, the liquid may be drawn over this part by means of the end of a tube. The excess of liquid is allowed to run off, and the glass is placed upright against the wall. At this point two methods of operation present themselves.

"1. The glass is left for a few minutes only to the influence of evaporation; the film becomes opaline, and the excess of liquid collects at the lower part of the glass; this is removed with a bit of blotting paper, and the plate is plunged in a bath of nitrate of silver, strengthened with acetic acid and recently precipitated acetate of silver. The film whitens, as in ordinary processes, by the formation of iodide of silver; it is then exposed in the camera, and the picture developed in the usual way.

"2. If, on the contrary, the glass be allowed to dry, the ammonia being totally eliminated by evaporation, the ordinary reaction of alkaline iodides on the salts of deutoxide of copper takes place; that is to say, protoiodide of copper ($Cu_2\,I$) is formed in the film of cellulose, and iodine on the surface. Such a glass is red when dry. Immersed in the nitrate of silver, it gives a superficial image which the slightest washing carries away, and more metallic silver is formed under the picture by the presence of the protoxide of copper. But I have endeavoured to find a remedy for these drawbacks, because this method will find numerous amateurs on account of its simplicity, and I have succeeded by passing the glass through absolute alcohol, in which a current of dry ammoniacal gas has been passed. The free iodine is converted into iodide of ammonia, and aldehyde is formed ($2\,I + 2\,NH_3 + C_4\,H_6\,O_2 = 2\,NH_4\,I + C_4\,H_4\,O_2$).

"A few seconds immersion suffices to whiten the glass. On removal from this bath it should be waved in the air, to insure the evaporation of the excess of ammonia, and then immersed, while still wet, in the nitrate of silver; the remainder of the manipulations being the same as usual. Pictures are obtained in this way of great delicacy, extreme transparency, and very suitable for the reproduction of views in which great delicacy and sharpness are necessary. I may observe, in passing, that, instead of ammoniacal alcohol, I employed distilled water, ammonia gas, &c., but the results were far from being as favourable.

"In conclusion, cellulose will evidently supersede gun-cotton in photography, the preparation of the latter for photographic purposes being difficult, and subject to numerous accidents. The process I propose is of extreme simplicity, very economical, and it yields proofs of very great delicacy, at the same time that it is very rapid in its action, especially the first method."

THE NEW ACTION OF LIGHT.

BY M. NIÈPCE DE ST. VICTOR.

The following is the note referred to by our Paris correspondent, in his letter of the 5th inst., as about to be published in *Cosmos*:—

"To obtain the conviction that there is really an action of light when a sheet of sensitised paper is covered with a tube containing a piece of insolated cardboard, it is only necessary to make the following experiment:—Take a sheet of Bristol board and from it cut two pieces of equal size; put one of these pieces round the inside of a tube without insolation, and after insolating the other, line a precisely similar tube with it, and invert the two tubes over negatives (formed, say, of large printed letters) placed on the same sheet of sensitised paper, and leave them in a dark and cool place for twenty-four hours; after which time the sensitive paper must be dipped in gallic acid, and it will be seen which is the most vigorous image; if neither of the substances used has received the slightest influence from the action of the light, no image will be visible on that part of the paper which was covered with the tube containing the non-insolated cardboard.

"If the insolated cardboard had been properly impregnated with tartaric acid or a salt of uranium, the action of the light would have been all the stronger on the sensitised paper; but I must not omit to state that the solutions of tartaric acid and salt of uranium must not be too concentrated, because in this case crystallisation is produced on the paper which hinders the action of the light; also, that a too prolonged exposure to the light causes a diminution rather than an augmentation of activity; it in some way becomes weaker after attaining its maximum of intensity.

"I may observe, also, that the same result which I have pointed out as following on the inversion of the tubes for twenty-four hours may be obtained in ten minutes; to accomplish this, it is only necessary to slightly moisten the cardboard and heat it to a temperature of from 120 to 140 degrees, but not higher, for at 212 degrees, or even less, there is an action of heat which produces the same effect as light. But these two essentially distinct actions must not be confounded, although they may produce themselves simultaneously.

"In a word — the more the cardboard is impregnated with substance and insolated (without, however, exceeding certain limits), the more activity it acquires. Hitherto I have obtained the maximum of activity by means of tartaric acid.

"The nature of the size used for the paper or cardboard often suffices to make it acquire considerable activity.

"Now, if Mr. Crookes repeats his experiment of the cardboard impregnated with tartaric acid (non-insolated) without heating his tube, he will certainly not have any action; but if he operates comparatively with an insolated cardboard, he will have an impression which will be all the stronger as the operation shall have been continued a greater length of time; for the activity is very far from being totally liberated in twenty-four hours, if the operation be conducted dry and at a low temperature.

"Humidity, and a heat of from 120 to 140 degrees, speedily liberates this activity; but care must be taken to avoid raising the temperature to 212 degrees, because in this case there is an action of heat which acts chemically on certain papers sensitive to the action of light, and equally so to heat, as are all papers that are acid.

"For the rest, the best means of distinguishing the action of light is to take a paper insensible to heat, but remaining sensitive to light, as one prepared with an alkaline salt of silver."

PHONAUTOGRAPHY; OR, THE GRAPHIC FIXING OF THE VOICE.

We have already briefly referred to the curious essays of M. Leon Scott, and we believe it will be of interest to our readers if we allow the inventor, naturally enthusiastic, to develop the happy idea he has conceived at greater length.

"Sound, as well as light, gives a durable picture at a distance; the human voice being able to record itself, in the manner proper to acoustics, on a sensitive surface; and after long efforts, I have been enabled to collect the tracings of all the movements of the air which constitute sounds, or noises; in fact, the same means have enabled me to obtain, under certain conditions, a faithful representation of rapid movements—of movements inappreciable to our senses from their smallness, and of molecular movements.

"It is a plan, as you see, by this new art, of forcing nature herself to constitute a written general language of all sounds.

"When the idea first occurred to me, more than four years ago, of fixing on a sensitive surface the trace of the movement of the air during singing or speaking, most of those to whom I confided my idea treated it as a chimera. The word did not appear to me to prove anything; it is the ordinary reception of the most sublime conquests of human intelligence, and my weak efforts have that in common with many great discoveries which in their cradle have been treated as utopian. I must admit, nevertheless, that this summary judgment was not without some appearance of reason. What is speech, in fact? A progressive movement of the air which surrounds us, induced by the play of our organs; but a very complex and infinitely delicate movement. This delicacy is such, that if you speak in a darkened room, in which only a single ray of sunshine is allowed to penetrate, the finest particles of dust in suspension, visible only in the luminous space, will not be agitated in a sensible degree. On the other hand, this subtile movement is exceedingly rapid. While one is speaking in an ordinary tone of voice, more than six hundred of these invisible movements of the air succeed each other in the short interval which intervenes between two strokes of the pulse, that is to say, a second.

"How, then, to succeed in fixing a clear, precise, complete trace of such a movement, incapable of agitating even one of our eyelashes? Ah! if I could only fix a pen or style on that air which surrounds one, and which receives all the elements of a sound, this pen, this style would form a trace on an appropriate fluid film. . . . . But where find a point of support? . . . To fix a pen on this fugitive, impalpable, invisible fluid, is a chimera, is impossible!

"This apparently insoluble problem is, however, solved somewhere. Let us attentively consider that marvel of marvels, the human ear. I say that our problem is solved in the phenomenon of hearing, and that the contrivances employed in the structure of the ear ought to lead us to the object sought. I don't just now pretend to make an incursion into the domains of the physiologist, but I must seek for what I require in the place where it is to be found. I have, besides, no necessity for any new theory on the organ of hearing, or on the manner in which it acts.

"This point found, the thing becomes one of rare simplicity. First of all, what do we see in the ear? A conduit. But what is a conduit? At the commencement of this century, on a calm night, M. Biot held a conversation in a low tone of voice, in whispers in fact, with another individual who was stationed at the other extremity of a tube made of brass, and which was 1,000 yards in length. Hence, in a conduit of any length whatever, properly isolated from all external movements, from all agitation of the strata of atmosphere, the feeblest murmur of the voice is transmitted integrally to any distance. The conduit conducts, without alteration or diminution, the sonorous wave, complex as it may be, from one of the extremities to the other, by preserving it from all accidental causes which might disturb it; and if the conduit is in itself incapable of vibration, if no loss of the vibratory movement is accomplished on the journey, the wave will pursue indefinitely its primitive movement with the original purity, sharpness, and intensity. Such is, in acoustics, the part performed by a conduit in presence of a fluid in movement. I take note of this to obtain the autograph of sound at any distance. The conduit once found, I take possession of it and fashion it into a sort of funnel to concentrate the sounds towards its lesser extremity.

"Let us pursue our examination of the ear. At the end of the external auditory conduit, we encounter a thin membrane, tympanised and inclined. This membrane, according to the just definition of Müller, is a something half solid, half fluid; it partakes of the one by its coherence, of the other by the extreme facility of the displacement of all its molecules. It is the medium employed by nature for the transmission, as perfectly as possible, of the movement of a fluid to a solid. In the construction of the ear the divine artist has employed three membranes. We have just now seen that the sound of the voice does not sensibly agitate the dust suspended in space; yet we see that at a distance of more than ten yards, in a quiet room, during the night, the voice causes sand sprinkled on the surface of a membrane, stretched over a glass, to dance up and down energetically.

"We grasp now, in all its lucidity, the luminous thread which is to guide us; this support of our pen on the fluid in movement, which I asked for but a little while ago, is found; it is the thin membrane which we place at the extremity of our artificial auditory conduit.

"I have remarked that it was necessary, for the integral solution of the problem, that the style which was applied to fluid in motion, or, which comes to the same thing, on the membrane, should mark its trace on a second fluid. Indeed, any mode of inscription which should require an appreciable force would be impossible for our quasi aerial pen. It followed, therefore, that our sensitive surface must be fluid, in order that it might not offer any resistance to our delicate imprints. Well, just as we have taken a semi-solid for a pen, we shall take a semi-fluid for a matrix: this shall be lamp-black obtained from the smoke of burning bodies. A thin film deposited in a semi-fluid state, on any body whatever (metal, wood, paper, or tissue), and animated by an uniform movement of progression, in order that the traces formed shall not impinge the one on the other, such shall be our daguerrean plate, or rather our negative, capable of giving, by known means, thousands of proofs.

"You see the invention of the autography of sound and its fixation is, so to speak, consummated; it only remains to improve and extend the process, to apply it to science and the arts. I will not insist on the direct experiments which prove that all the elements of the voice pass by the membrane; that, with the requisite dispositions, its movement is adequate to that of the sonorous fluid. I will say nothing either of the form and dimensions of my artificial auditory conduit, of the preparation of the thin membrane, of the substance of the style and its mode of application; of the part performed by what is called the hammer. These are questions which are, without doubt, very important in the practice of this difficult art; but it would take too long to develop them here.

"I will hastily quote one or two facts in support of what I advance:—

"Every mass of air comprised within a limited space has, as is known, a proper tone, in which it resounds more easily and strongly than in any other. In a pipe it is this tone which is called the fundamental tone. Admit that this tone records itself in a manner distinct from all other tones—which is, in fact, the case—and there is a fixed unison found, a point of departure, without the intervention of the ear, for the accord between the instruments and the voices.

"I have observed that when it is a question of gathering sound at a certain distance, the conduit ought to be of a substance that will not vibrate. If it were sonorous, the vibrations of the membrane would become feeble; for at each transmission from a fluid to a solid they lose a considerable part of their amplitude. This circumstance of the vibration of the conduit caused by the voice, unfavourable to the autography of speech and song, furnishes us a means of recording the molecular movement of woods, metals, or alloys, under the influence of fixed and determined sounds; we might thus be able to acquire a knowledge of the mode of sonorousness of bodies in relation to their intimate texture. One of my plates yielded a notion *de visu* on the movement of a pipe made of ash wood under the influence of sounds and the voice. The style which wrote was placed directly on the wood instead of on the membrane. Each of the different materials employed in the arts, will give in this way a distinct *autograph*, the character of which will be subordinate to the disposition of its fibres, to its more or less perfect homogeneity, and its density. This opens the road, I hope, to some grand discoveries, as well as to useful applications to several manufactures.

"Phonautography reproduces not only the *tone* of the sound, it also represents in its way, the *pitch*.

"I have collected a certain number of proofs presenting the sounds of the voice compared with those of the cornet-à-piston, the hautboy, and of a large caoutchouc membrane, giving very grave sounds. The instruments, as might be imagined, distinguished themselves from the voice by the characters of the vibration. The traces of shouts or howling are clearly distinct from those of singing. I have been able to verify this curious fact, that the sound of an instrument, or a voice, gives a series of vibrations as much more regular and equal, and consequently more isochronous, as it is more pure to the ear, better heard; in the shriek, in the sharp sounds of instruments, the waves of condensation are irregular, unequal, non-isochronous. One might almost affirm that there are from this point of view, discordant sounds of an absolute form. Here is another aspect of the question of the *pitch*: it is a plate which shows the bad sounds of the voice—sounds that are not clear and sharp. With a little attention one may perceive, sometimes, two and even three secondary vibrations combined with the principal wave.

"The almost indefinite facility of separation of the molecules of the semi-fluid film will permit the extension of the investigations, and to obtain with ease the trace of the most subtle and delicate movements, other than the sonorous movements—the movements, for example, of the pendulum, of the magnetic needle, of the vibrations due to elasticity, or to torsion. As a specimen of this kind of study, the field of which appears to me sufficiently extensive, I show the trace of a movement singular in physics; that of a steel teetotum which slowly descends an inclined plane balancing itself on its axis. The number of its revolutions and the movement of libration are clearly marked. The attempts of producing the autographs of different explosions and quick noises, prove that it is easy to appreciate and measure, by this means, their succession, their character, and their relative intensities.

"Here is, then, a perfectly new graphic art which springs from physics, physiology, and mechanics. I shall, I hope, be excused from replying to the commonplace objection, '*What is the use of it?*'—always ready to salute a budding invention. It is, however, a question that I foresee, and to which I desire to respond with distinctness before I finish. Are you in a position, they will say to me, to give, without costly apparatus, without fresh essays, a natural stenograph, capable of immediate translation, of a speech? No. And this is the reason why the tracing of the words, which I possess at this moment, besides being incomplete, is but the analysis of the elements of the spoken voice; it is, to use an expression of mathematicians, a function of the tone, intensity, and the pitch. It is not, then, a true synthesis of the word, nor, with greater reason, a purely conventional sign, like writing, which has, let us remember, no phenomenal reality. This synthesis, nevertheless, I believe possible, and I propose to attempt it. But great obscurity still weighs on the history of the articulated voice; when we know precisely what it is, after a complete study of each of its elements by our processes, we shall transform, by mechanical means, the tracing of the words into a succession of signs. I shall prefer, at this moment, to proceed from the simple to the compound, and to realise the stenography of singing and instruments, which will be easy, with a motive power of a uniform movement. I solicit the advice of men competent to assist me in preparing a more sensitive membrane, less hygroscopic, more approaching to the physiological membranes, than those used in commerce; for, as you are aware, commerce does not keep ready prepared the materials indispensable to unforeseen applications. I shall very willingly profit, also, by the suggestions of practical men as regards the question of reinforcement of the sound which presents itself, as a necessity, in the autography of spoken words.

"There are, I have no intention of concealing it, numerous precedents in the career on which I have entered. I could not, without too many digressions, trace a historical summary. I shall content myself with citing the names of Felix Savart, Jean Müller, MM. Duhamel, Arthur Morin, Pouillet, Wertheim, and Lissajous. Will these imperfect essays I have produced, procure my pardon for having dared to enter upon the ground trodden by such masters? I hope so, for I have already advanced much farther than they, perhaps, would have dared to prophesy."

We are happy to be able to announce that at this moment, M. Leon Scott, aided by the theoretical and practical ability of M. Rudolphe Kœnig, has just manufactured a new apparatus which registers with the greatest clearness the vibrations of a diapason even if they be of the number of a thousand a second. The registration on lines widely separated continues during twenty-four seconds; and the apparatus is in relation with one of M. Redier's chronometers, which divides this interval of twenty-four seconds into four intervals of six seconds each. We may, then, by a single experiment, count the number of vibrations of a given diapason, and make by simple tentatives that this number shall be rigorously equal to a given number: 870 for example. The problem of the diapasons and standard instruments, proposed by the Ministerial decision of the 1st of February, 1859, finds thus its easy and complete solution, and it seems to us impossible that this solution should not be immediately adopted.

We have also seen all the plates of which M. Scott speaks in his note—the tracery of simple sounds, compound sounds, chords of a prayer recited, a phrase declaimed, vibratory and gyratory movements of bodies animated, with, at the same time, a movement of transmission and rotation, &c., and we have found them truly surprising. We desired that they should be seen by Professor Wheatstone, who has himself done so much that is interesting in acoustics, and, like us, he found these essays of great promise for the future. He even undertook to bring the matter before the Royal Society of London. It is, therefore, with great confidence that we initiate our readers in the knowledge of this advance in the path of progress. F. Moigno.

GOLD TONING PROCESS.

BY M. LE GRAY.

I have learnt that since the publication of my process of fixing positive proofs by chloride of lime and neutral chloride of gold, many persons have employed the process without obtaining as satisfactory results as those I obtained myself. This has arisen, I believe, in the first place, from want of habit, and experience of the force of the bath I have suggested, which, acting very energetically, does not allow of the action being followed without constant attention, and, consequently, it is very difficult to seize the exact moment when the proof ought to be withdrawn from the bath. By employing the following formula the progress of the operation will be much slower, and, consequently, more easy to follow:—

Distilled water	2,000 parts.
Chloride of lime	1 ,,
Chloride of gold	1 ,,
Chloride of sodium	1 ,,

The proof may remain in this bath for half an hour without detriment; the toning proceeding so slowly it is easy to arrest it at the moment it has acquired the desired depth.

I would observe that a bath of two litres, or quarts, containing only a very small proportion of chloride of gold, can only be efficacious in the case of about a score of proofs of the size of a quarter of a sheet; after toning them, it is advisable to restore the energy of the bath by adding a small quantity of the solution of chloride of gold, and a little pinch of chloride of lime. But, until the operator has gained considerable experience, it is better to prepare a new bath altogether after toning the number of proofs mentioned. The residues may be put aside, and the gold extracted by means of sulphate of iron. The permanency of a proof toned in this bath is very great, and its whites strikingly clear; the gold is deposited on the reduced silver which forms its blacks, at the same time that the coloured organic matter of the paper is restored to a white, by the well-known action of the chloride of lime.

One of the chief causes of its permanency, also, is the complete absence of free nitrate of silver in the fibres of the paper. In fact, when a sheet of paper containing free nitrate of silver is put in a hyposulphite of soda bath, this nitrate decomposes the bath by giving birth, in the substance and on the surface of the sheet, to sulphur, and to a sulphide of silver, which subsequent washings in water cannot remove from the proof, and which are an ultimate cause of change.

By submitting the proof to the action of the chloride of lime, previous to fixing, all the free nitrate is converted into chloride of silver, which, being completely soluble in hyposulphite of soda, can be entirely removed from the proof by a suitable exposure to its action; only, as the quantity of free nitrate of silver in the proof is somewhat conspicuous in reducing the chloride of lime bath to such a very weak proportion, it will be readily understood that after two or three proofs it would all be decomposed, and that, in consequence, I am obliged to add chloride to the bath, inert as regards the toning action; this is chloride of sodium, to furnish an element to the decomposition of the free nitrate of silver into chloride.

In comparing the proofs obtained by my process with those obtained by the old method, I must tell you that they were taken on paper prepared several days previously, and discoloured; in the old process this discoloration is evident, but in mine the tones are fresh, and the paper white. I would also observe that one great advantage of the new process is to enable it to be perceived directly it is dry, if the proof has been thoroughly deprived of its chloride of silver.

In cases where it remains in the fibres of the paper, this chloride will blacken immediately, and be rendered evident by transmitted light in the form of black spots.

To know, in a mathematical manner, the time it is necessary to leave the proof in the hyposulphite of soda bath for all the chloride to be removed, the following experiment must be employed:—

Put in two test tubes a like quantity of the hyposulphite of soda (500 parts of solution for example); then take one part of dried chloride of silver, and one part of iodide of silver, and these two products must be put, at the same moment, in each of the two tubes, and the exact time noted on a watch. The iodide requires a longer time to dissolve, the difference varying according to the temperature; the difference between the solubility must be noted. This known, a sheet of paper is prepared with the iodide of silver, with the same proportion of iodide by weight as the chloride found in the same paper, prepared for the time of ordinary positive proofs. When this paper is dry it is placed in the hyposulphite of soda bath, the exact time being marked by a watch.

As the iodide of silver is yellow, the moment when it has entirely disappeared from the paper can easily be seen; and the exact time having been ascertained, the proportionate time to allow the corresponding chloride paper to remain in may be calculated from the first experiment.

It will be understood that this second experiment is necessary, for the confinement of the precipitates in the cells of the paper must necessarily change the soluble action of the hyposulphite of soda on the salts to be dissolved.

I give this method of ascertaining the exact time necessary for removing all the chloride of silver from a proof, because, when the exact moment is seized, the proof has a brilliancy and vigour which it cannot have when it has been exceeded. The other operations are the same as those described at page 253, vol. i., of the "Photographic News."

COMPARATIVE EXPERIMENTS ON DRY PROCESSES.

BY W. L.

How invaluable, to many of your amateur readers, would be a faithful report of a committee of practical and *unprejudiced* photographers, on the comparative merits of the dry preservative processes, which for the last few months, amidst conflicting statements, have been striving for supremacy.

This expression has, to my certain knowledge, echoed its utterance from every nook of the country where the camera has found its way, and indicates a desideratum which, no doubt, many of your readers could supply.

Allow me, then, by one or two observations on an article of great interest, by Mr. Draffin, contained in your publication of the 8th inst., to endeavour to contribute a few facts resulting from my own experiments, undertaken to ascertain the value of Fothergill's process compared with Taupenot's and Dr. Hill Norriss's. With each of these processes I have worked largely and successfully, and can fully appreciate their value. But my decided preference is accorded to the former, for I have found it fully equal to the latter in keeping qualities, and in sensibility *considerably superior* to either. Now this conclusion, your readers will perceive, is directly at variance with Mr. Draffin's conclusions in the second sentence of his communication.

Which of these conflicting statements, then, is to be credited? I have as little doubt of your correspondent's veracity, as I have of my own.

Both of us, unquestionably, are stating what, by ocular demonstration, we can prove to others and to *each other* as a *fact*—and "facts are stubborn things" from whatever point of view we examine them.

Here lies the solution of the difficulty—in this direction must we seek for an explanation of the discrepancy, viz., the *extent of the washing on the removal of the plate from the bath*, *i.e.*, the amount of the free nitrate of silver left on the plate when the albumen was poured on. I insist on this point the more especially, because, although the character of the collodion, and the strength of the silver bath, of course, affect the sensibility of the plate, I assume that your correspondent employed in his *comparative* experiments the same collodion, and *did not excite the Fothergill plates in the acidulated Taupenot bath.*

When I tried my first experiments with the process in question, I followed the directions of its discoverer as contained in its announcement in the *Times*—which were *indefinite*, and therefore *defective*. We were told simply to *wash the plate*. My conclusion, therefore, was, that the object of the washing, as in other dry processes, was to rid the sensitised film of the free nitrate, instead of leaving sufficient imprisoned amidst the molecules of the collodion to form the albuminate of silver (with probably a slight excess of silver), which constitutes the peculiar and valuable feature of this process. From this cause, the first plates I prepared required about double the exposure of the collodio-albumen, and even then the impression was faint and worthless.

If your correspondent would employ a non-contractile collodion (which, although by no means essential, is, I think, preferable)—excite his plate in an *ordinary negative* bath—drain closely on its removal; then immerse it in a second nitrate bath, containing two grains of silver to the ounce, raising it up and down until all appearance of greasiness is removed; and then dose it, after draining for a minute and a half, with albumen, as generally directed by the advocates of this process, I apprehend he will see reason to change his opinion of its "utter uselessness for taking interiors."

I cannot absolutely say that I have taken *better* pictures by this process than by either Taupenot's or Dr. Norriss's, for I can conceive *nothing to be wanting in a picture obtained by either the collodio-albumenised or gelatinised plates when well manipulated;* but, in my hands, this process exhibits greater sensitiveness than the latter, in the proportion of a minute and a half to two minutes.

Should your correspondent, Mr. Draffin, wish to communicate with me, or to inquire into any particulars which he may conceive to be omitted in this article you have my full permission to hand him my address.

SACCHARO-SULPHATE OF THE PROTOXIDE OF IRON AS A DEVELOPING AGENT.

BY MR. HUGH ROBERT RUMP.

Having, in common with all photographers, experienced the great difficulty, if not impossibility, of preserving the protosulphate of iron from further oxidation, and thus losing its value as a reducing agent, I was induced some time since to make trial of the saccharo-protosulphate of the same metal, and, I may add, with the best results. The saccharo-sulphate of the protoxide of iron crystallises in most splendid pale green rhombic prisms, in stoppered bottles remains unaltered for many months, and is readily soluble in water, the solution keeping unoxidised for a considerable time. These properties render it an admirable substitute for the common protosulphate. It answers equally well for a negative or a positive developer, and, I fancy, has less tendency to stain or fog the plate than the old protosulphate; at the same time producing a denser and more vigorous picture.

Lessons on Colouring Photographs.

ALBUMENISED PAPER.

For this purpose we prefer the so-called "Photographic Water Colours," made by different colour manufacturers. Those are best which contain rather more gum than usual, which, of course, renders them more transparent, and consequently more suitable for this purpose.

Sable brushes will be found to work best, always observing, that the larger the brush you can manage to manipulate with, the freer will be the work.

There is an article also sold by the colour makers, called "Water Colour Medium," which will be found capable of preserving transparency throughout a picture, and especially in the shadows. In the absence of this, however, make a gum to work with of quarter-ounce gum arabic, teaspoonful of whisky, lump sugar about size of a filbert, and two ounces hot water; when dissolved, filter through muslin (the greatest cleanliness being necessary), and it is then ready for use.

The only other material to be mentioned is, the "burnisher," an instrument consisting of an agate, set in a mahogany handle, to enable the hand to grasp it firmly; the best form for which is the following.

The use and purpose of this instrument is to render the surface of the photograph hard and smooth, by rubbing on the back of the picture, with great pressure, whilst the front is laid upon a flat piece of *thick plate glass*, and, without which, no artist can make his picture look anything but rough.

It is strange that, in most works at present published on this subject, the burnisher and glass plate are omitted, and no reference made thereto, when they are used by every photographic colorist upon paper, of any note, in London, and cannot be dispensed with; in fact, it would be impossible to work well upon paper unless the surface were constantly kept hard and smooth.

A photograph, in printing and toning, may be made of different colours; that most convenient for painting is something between a cool grey and bright chocolate, inclining to the former—having the highest lights upon the flesh, as nearly white as possible—minding not to have any creases or cracks in it, as then the colour would run in, making a palpable line.

You will also require a copy something darker, to be used as a guide during the progress of the picture, that you may not depart too much from the likeness.

COLOURS AND THEIR COMBINATIONS.

In the following we have only named such colours as will be most frequently mentioned in the course of this work.

White.—Chinese white is unchangeable, being the oxide of zinc, but, being slightly transparent, is not so good for giving bright points as permanent white.

Crimson lake.—A generally useful colour—the most transparent red known; entering kindly into all tints connected with purple, lilac, &c. Crimson lake, thinned with water, makes pink as well as any colour.

Vermilion.—Chinese vermilion is brightest. This colour, with lake in half tints, is good for military coats, &c.

Carmine.—The purest, brightest, and most intense crimson known; may be deepened by glazing with lake.

Indian yellow is the brightest transparent yellow we possess, therefore most necessary in painting photographs; it also, with Roman ochre, represents gold, slightly washed on, well enough for tinted pictures.

Chrome.—There are several degrees of chrome. They are useful as body colours in painting the light parts of yellow drapery in gold lace, &c.

Gall stone.—A strong yellow—transparent—suitable for sallow complexions, such as many old people's, whose colour is principally made up of warm yellow in the lights, and purply greys; also useful for glazing draperies, which, in good photographs, want nothing more than a transparent wash.

King's yellow.—Used for bright light touches on gold, &c.

Burnt sienna.—Very rich yellow brown, inclining to red, used, with lake, in the carnations of warm complexions.

Raw sienna.—A rich transparent yellow, useful, with lake or vermilion, to warm up the flesh tints.

Prussian blue.—The deepest, most transparent blue known.

Antwerp blue.—A delicate transparent blue, used in flesh greys.

French blue.—A bright opaque blue, equal in effect almost to ultramarine by day, but looks black by gaslight.

Cobalt.—A light bright opaque blue, used with lake in almost every pearly grey tint throughout a head.

Indigo is a deep grey blue, more suitable for backgrounds.

Ultramarine.—Extremely brilliant opaque, useful for the lights in blue silks, satins, &c.; too heavy for flesh.

Ivory black.—Used with white for the lights in black cloth.

Lamp black.—With lake, for intense shadows in cloth.

Neutral tint.—A purply slaty colour—dark grey—used for deepening cool backgrounds, semi-transparent.

Vandyke brown.—A fine chaste brown used for backgrounds.

Madder brown.—Useful for deepening the shadows of flesh.

A brown of general application is to be made of burnt sienna and black; may be varied and made either warmer with more sienna, or cooler with more black.

Sap green is suitable for painting backgrounds of an olive colour; which it represents added to pan brown in various degrees.

Emerald green—an opaque bright colour—may be used as a body colour for the lights of silk and jewels, to be glazed over with a transparent green made of Prussian blue and raw sienna, when a rich effect is produced.

Purple is made of blue and crimson lake; the royal purple being nearly all lake.

Orange.—Crimson lake and Indian yellow.

(*To be continued.*)

Dictionary of Photography.

Caseine.—The curd or coagulable portion of milk. It has been proposed to be used in photography, and several papers on the subject will be found in our first volume. It may be prepared as follows:—Take white cheese and heat it with a solution of carbonate of soda in such a way that after a contact of several hours there shall be a little cheese in excess. Filter, and pour into the solution some lime water, when there will be produced an abundant precipitate consisting of almost pure caseate of lime. Filter through a cloth, well wash, and allow to dry spontaneously. When caseine is required, take a small quantity of this caseate of lime and add it to dilute hydrochloric acid in such proportions that a little of the salt shall remain undissolved; filter, and wash the precipitated caseine with care. It will be found convenient to preserve it in the form of caseate of lime, and only convert this into caseine in small quantities as required for use, as the body itself soon putrifies.

Catalysotype.—A name given by Dr. Woods to a process discovered by him. Paper is first prepared with syrup of iodide of iron, and then, when dry, with nitrate of silver. After exposure in the camera, the picture gradually developes itself. The process is of interest owing to the curious phenomenon which it presents of the picture gradually developing itself; but it has not been hitherto much employed in practice.

Catalysis.—This term was proposed by Berzelius to be applied to that modification of the force of chemical affinity, by virtue of which, he says:—"Certain bodies exert by their contact with others such an influence upon these bodies that chemical action is excited, compounds are destroyed, or new ones formed, although the substance by which these actions are induced does not take the slightest part in these changes." The whole doctrine of catalysis, or *action by contact*, is, however, involved in great obscurity, and it is not at all improbable that the peculiar effects ascribed to it may eventually be explained without having recourse to the theory of a new force. The immediate decomposition of gallo-nitrate of silver, if placed in a dirty vessel, while the same mixture would keep for hours in a clean vessel, is a familiar illustration of catalysis; the impurities on the surface of the dirty vessel exert a *catalytic action* on the gallo-nitrate in contact with it, and the whole rapidly decomposes.

Caustic.—In chemistry a body that exercises a corroding or solvent action on substances, principally the skin, is called by this name—thus, strong sulphuric acid, potassa, and nitrate of silver are said to possess caustic properties. The term is also usually applied to signify an alkali or alkaline earth uncombined with carbonic or other acid, *e.g.*, caustic potassa, caustic baryta, &c. *Lunar Caustic* is the old name for nitrate of silver, when fused and cast into sticks for surgical use.

Centigrade—having a hundred degrees. The term *centigrade scale* is usually applied to the continental methods of graduating thermometers, in which the number of degrees between the freezing and boiling points of water is divided into 100 degrees—the boiling point being 100°, and the freezing point 0°. The following table, of similar temperatures, on both the centigrade and Fahrenheit scales, will be found useful. They are taken at every fifth degree on the centigrade scale in order to avoid fractions:—

Cent.		Fahr.	Cent.		Fahr.	Cent.		Fahr.
0	equal to	32	35	equal to	95	70	equal to	158
5	,,	41	40	,,	104	75	,,	167
10	,,	50	45	,,	113	80	,,	176
15	,,	59	50	,,	122	85	,,	185
20	,,	68	55	,,	131	90	,,	194
25	,,	77	60	,,	140	95	,,	203
30	,,	86	65	,,	149	100	,,	212

The centigrade scale is generally used in France, and very frequently in England, especially in scientific researches.

Centimetre.—A French measure of length, equal to 0.394 inches; 10 centimetres, therefore, are nearly equal to 4 inches, and 100 centimetres, or 1 metre, are equal to about 39½ inches. The *cubic centimetre* is frequently employed as a measure of capacity; it is equal to 17 minims; 100 cubic centimetres about equal 3½ fluid ounces; and 1,000 cubic centimetres, or 1 *litre*, equals 35¼ fluid ounces.

(To be continued.)

A Catechism of Photography.

NEGATIVE PROCESS OF PRINTING.

Q. May not positive photographs be obtained by a negative process?

A. They may, and with very good effect.

Q. When is the negative process most useful?

A. In the dull winter months, as the chemical action of the light on the chloride of silver is then a very slow and tedious process.

Q. How is the negative process conducted?

A. By exposing for a short time the sensitive paper under a negative photograph to the action of light, and by developing by a subsequent process the latent image thus obtained.

Q. What is the best method of preparing the iodised paper for the latent image?

A. A very good iodised paper may be thus prepared: make the following solution:—

Iodide of potassium	10 grains.
Water	1 ounce.

Float the paper on the solution, and dry in the usual way. Sensitise the paper in a bath of—

Nitrate of silver	20 grains.
Glacial acetic acid	30 minims.
Distilled water	1 ounce.

Three minutes' contact with this solution will be amply sufficient.

Q. How is the paper so prepared to be used?

A. By placing it in contact with the negative in the printing frame, and by exposing it to the action of light.

Q. How long should the paper be exposed to the action of light?

A. For a few seconds; half a minute is generally sufficient, but this depends on the intensity of the light. The exposure has lasted long enough when a change is observed to take place in the colour of the margin of the prepared paper.

Q. How is the image developed?

A. By means of a saturated solution of gallic acid rapidly brushed over the surface.

Q. Is the process always conducted in the same way?

A. Certainly not; several plans have been suggested and are adopted by different photographers with more or less success. M. Vigier, Le Gray, Nièpce de St. Victor, in France, Sir W. Newton, and many others in England, have directed their attention to this process, and in some particulars their formulæ differ.

Q. Describe the process of M. Vigier?

A. The iodised paper is prepared in a solution composed of nitrate of silver in distilled water, and iodide of potassium in distilled water, mixed together, and the precipitate dissolved in an excess of the iodide of potassium. After receiving a coating of this compound solution, the papers are immersed in clear water for twelve or sometimes twenty-four hours; they are then dried, and the surface so prepared presents a slight yellow tint, very pale in colour, but equal in all parts. The papers are sensitised in a solution of—

Distilled water	250 parts.
Aceto-nitrate of silver	5 parts.

The aceto-nitrate of silver is thus prepared:—

Nitrate of silver	10 parts.
Acetic acid	20 parts.
Distilled water	100 parts.

The papers are floated on the surface of the bath for two or three minutes; they are then partially dried on blotting paper and exposed, as before stated, to the action of light in the printing frame. The latent image is developed by a saturated solution of gallic acid, to which is added a few drops of aceto-nitrate of silver: this solution being placed in a basin, the paper is floated on its surface, and the image, when sufficiently developed, is washed first in a bath of hypo. sulphite of soda, and afterwards in a bath of clear water. Pictures so obtained are generally very effective.

Q. Describe M. Le Gray's process?

A. His process consists in making the paper float on a solution of—

Rice water	1000 parts.
Sugar of milk	45 parts.
Iodide of ammonium	20 parts.

It is sensitised in a bath of aceto-nitrate of silver, immediately dried between leaves of blotting paper, and exposed in the printing frame under the negative. The image is developed by a saturated solution of gallic acid, and when all the details are visible, a red or black tone is given to the proof by the application of aceto-nitrate of silver. It is washed in a solution of hyposulphite of soda, containing a very small portion of chloride of gold.

Q. Describe M. Nièpce de St. Victor's process?

A. The paper employed in this process is not submitted to any previous preparation; it retains its chemical activity for several days, but must be used with great care. The paper is floated on a bath of nitrate of uranium composed of—

Nitrate of uranium	20 parts.
Water	100 parts.

After some minutes, it is taken from the bath and dried in a dark room. The paper is then laid aside for future use. For printing, the paper, prepared as already stated, is placed under the negatives and exposed to the light for ten minutes or a quarter of an hour. The latent image thus obtained is developed first in a bath of nitrate of silver, in which the image rapidly appears; that is to say, it is fully developed in thirty or forty seconds. The paper is then washed in several successive baths of pure water, and is fixed in a bath of chloride of gold. A bath of bi-chloride of mercury will answer the same purpose, but when this is employed it is necessary that the paper should be exposed for a much longer period to the action of light, during the printing process.

Q. Describe Sir W. Newton's process.

A. In this process bromide of potassium or calcium is used in place of the ordinary iodide of potassium, as it is said to yield a better tint, and to give greater purity to the white parts of the picture. Take of

Bromide of calcium	10 grains.
Gallic acid	5 grains.
Water	10 ounces.

A small piece of camphor should be soaked in the water for twelve hours to obtain a saturated solution; then add two or three lumps of white sugar, the gallic acid, and the bromide as already stated. The solution should be applied by brushing it over the paper. The exciting bath is composed of nitrate of silver, glacial acetic acid, and distilled water; it also is applied by the use of a brush. Immersion in gallic acid develops the latent image.

Q. Describe another process.

A. The paper in this process is prepared with serum of milk, with or without bromide of potassium. The papers are immersed in the bath. In the sensitising process they are also immersed, and the development is conducted by immersion in a solution of gallic acid. In the preparation of the serum of milk, it is advised to separate the caseine by rennet (previously washed to remove salt), in preference to using acetic acid.

Q. Are pictures taken by this negative process equal to those taken by the ordinary method?

A. Many of them are exceedingly good, but the amateur is advised to master the manipulation of the ordinary positive process before experimenting on that by development.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, April 11, 1859.

M. Nièpce de St. Victor presents this day to the Académie des Sciences another paper on the new action of light. The principal fact contained in this new communication is an experiment made in an ice-house. Having taken an iron tube he lined it with cardboard impregnated with tartaric acid, which had been already insolated, as in his previous experiments. This tube was then buried in ice for forty-eight hours, after which it was opened and its orifice applied to a photographic paper prepared simply with nitrate of silver and dried. A thin piece of printed paper was interposed between the tube and the sensitive paper to serve as a negative. The contact was continued for forty-eight hours, after which the sensitive paper was passed into a solution of gallic acid, when an image was immediately developed.

If the photographic paper had been prepared with iodide of silver, this image would have been stronger; but such as it is, it is sufficient to prove the possibility of obtaining images by this new action of light without the aid of any calorific radiation.

Messrs. Davanne and Bayard have repeated the curious experiment made by Mr. Young, in which it is proved that a photographic image can be *developed* on albumen or albumenised collodion in open day-light, and by the ordinary means, provided care has been taken previously to *fix* the image in the dark by means of a solution of hyposulphite of soda, which dissolves and removes all the iodide of silver. Their experiments confirm completely all that was stated by Mr. Young; and M. Davanne thinks he has now completely under his thumb a satisfactory theory of photography. "Reflecting," says he, "upon the chemical reactions that must take place in Mr. Young's experiment, I find in it a confirmation of the recognised photographic theory. . . As concerns negatives, the theory may be stated thus:—1st. Reduction by light of a very slight quantity of silver-salt to the metallic state; 2nd. Development of the image by a series of deposits of new atoms of silver furnished by the reducing bath and fixed by molecular attraction." We must leave it to our readers to estimate the value of this theory.

The exhibition organised by the *Société Française de Photographie* will be opened on the 15th of this month in the south-eastern pavilion of the *Palais de l'Industrie.*

M. Pouchet, whom we named in our last letter, has lately endeavoured to determine, by experiment, whether the atmosphere is really overloaded with minute, invisible eggs of infusoria and microscopic vegetables, as is generally admitted in the scientific world, and to which circumstance is attributed the spontaneous apparition of inferior animal and vegetable forms on decaying food, in stagnant water, &c. M. Pouchet's experiments have proved that it is almost absolutely impossible to discover any living germs in the atmosphere. The corpuscules this distinguished microscopist has recognised suspended in the atmosphere consist of *debris* of rocks, silica, minute fragments of vegetable matter, fæcula or starch, dead animalculæ in a complete state of desiccation, siliceous shells of diatomaceæ, &c., &c. But no eggs of infusoria, of algæ, of diatomaceæ, &c., were to be found. One of the simplest forms of these experiments consists in passing 100 pints of atmospheric air through a small quantity of pure water, and after leaving the water for a week, to examine it at the expiration of that time under the microscope; no animalculæ are to be seen in it. As dust is nothing more than a deposit formed by corpuscules that have floated in the air, M. Pouchet, to complete his observations, has examined dust deposited in France, in Italy, in Egypt, &c., but his search after living germs of animalculæ was not more successful.

In more than *one thousand* observations of this kind he only *twice* met with eggs of a large species of infusoria.

How then shall we account for this simple experiment?—In a cubic inch of pure distilled water, five grammes of any fermentescible substance is placed, and the whole covered with a glass bell, the capacity of which does not exceed one pint. This apparatus is kept at a temperature of 18° (centigrade) for one week, and at the end of that time the surface of the water is covered with myriads of animalculæ!

Sig. L. Cavanna describes, in the last number of the *Annali de Chymica* published at Milan, a novel method of obtaining pure crystallised silver: a certain quantity of any kind of silver is dissolved in nitric acid, and the solution is filtered if gold is present. This solution must be evaporated to dryness in a porcelain capsule to eliminate the excess of acid. The nitrate of silver is then taken up with distilled water and evaporated again as much as possible, without, however, allowing a deposit of crystals of nitrate. When the liquid is thus concentrated as much as possible, it is poured into a cylindrical vessel of glass, and pure distilled water is poured into it, taking care that the water and the salts mix together as little as possible; or, so that the distilled water form a layer above the solution of nitrate. One or more silver wires are then immerged very quietly into the solution, and the apparatus is gently placed in a water-bath, heated to 50° or 60° (centigrade), and left in complete repose. In about six hours it will be seen that a quantity of crystal of silver has formed on the lower part of the wires. These crystals adhere very feebly to the wires, they are separated, washed in water, then in hydrochloric or sulphuric acid, and then again in water, when they may be considered as pure silver. The author says nothing of the *form* of these crystals. The remaining solution can be concentrated anew, and will then furnish another supply of crystals, and so on, until no more silver remains in solution.

M. Silbermann has just presented to the *Société d'Encouragement* of Paris, a report of a new gas-burner invented by M. Monier. This burner is possessed of a double current of air; its characteristics consist in the interior envelop of the annular chamber being of porcelain; the burner is of pipe-clay; the chimney, cylindrical for two-thirds of its height, has the other one-third in form of a truncated cone, terminating in an orifice, the diameter of which is only half that of the cylindrical part. The chimney, the glass globe, and the lower part of the lamp (the basket), are all joined in one piece of glass, pierced here and there to admit air. The burner, which is of pipe-clay, is pierced with thirty holes. Its value is one half-penny, and it becomes harder and harder by use. This apparatus has been impartially compared with many others in its effects, and it has been finally decided that the gas-burner of M. Monier, whilst giving the same amount of light as that given by any other system, shows an economy of about one-third in the quantity of gas consumed.

Dr. Almagran, it appears, has discovered, at last, a substance that may probably in many cases be substituted for quinine or sulphate of quinine in the treatment of fevers. The newly proposed febrifuge is *ferrocyanuret of soda and salicine;* it contains, therefore, a bitter tonic, salicine, an alkali (soda), and nitrogen, qualities which are found united in quinine. It can be administered without danger in considerable doses (49 centigrammes, or about 10 grains). That it is really absorbed by the animal economy is proved by its being afterwards found in the urine.

This new medicine deserves to be experimented in England, since it appears to have met with much success abroad, and especially as used by Dr. Renucci, in Algiers.

In France a new plant, *Statice tartarica*, has been lately brought forward by MM. Masson and Payen, as a substitute for oak-bark in tanning skins. According to M. Payen's analysis the root of this plant contains three times and a half as much tannic acid as is found to be contained in a medium quantity of oak-bark. *Statice tartarica* grows largely in Russia, where, we are told, it has been employed in the preparation of leather.

M. Wöhler, professor of chemistry in the University of Gottingen, has just made the analysis of a meteoric stone which fell at Kaba, in Hungary, on the 15th April, 1857. This aërolite is black, and its colour was found to be owing to coal. Besides those elements generally found in meteorites (iron, nickel, silicates, &c.), it contains a certain quantity of organic matter, a carburetted hydrogen, very similar to paraffine. M. Wöhler has also found this same organic matter in the meteoric stone which fell in 1838, at the Cape of Good Hope. The colour of this stone is also black, and it contains 1.5 per cent. of carbon. This is the first time that organic matter has ever been discovered in those mysterious visitants commonly known as "falling stars."

An important election is taking place to-day at the Academy of Sciences here, to fill the vacancy left among the correspondents of the institute by the death of the distinguished chemist Gerhardt, of Montpellier.

The candidates presented are:—On the first rank, Professor Hofmann, of London; on the second, and alphabetically, M. Piria, of Turin, and M. Schrœtter of Vienna. We have not much doubt that Dr. Hofmann will carry all before him.

P.S., *April* 12.—I open this letter again to add that yesterday evening Dr. Hofmann was elected corresponding member of the institute by 40 votes, against 2 votes given for M. Piria, and 1 to M. Schrœtter.

PHOTOGRAPHY IN ALGERIA.*

You photographers, "who live at home at ease," have no notion of the sensation of comfort, of intense *bien être*, which one feels on finding oneself, after a day's hard exercise in the open air, before a blazing fire, in a picturesque situation, with a cup of hot coffee at the right hand, and a pipe filled with the fragrant weed in the left. No matter what the fatigues of the day have been, they are all forgotten then, and the present seems so delightful that one forgets to think of the future. For my part, having nobody to speak to of friends at home, I don't often suffer myself to think of them, as to do so would cause me more pain than pleasure, as I not unfrequently experience when I wake up from a dream of bright eyes and musical voices, and find myself among fellows whose voices sound more like the filing of the teeth of a big saw than anything else. At such times the feeling of nostalgia is so strong that I cannot recover myself for some time. However, I must dismiss this from my mind, and return to the subject where I started from it. After smoking had been continued for some minutes, one of the Arabs called upon the recognised story-teller of the party for a tale, and when this was finished, another succeeded it, generally a love tale, the peculiar beauties of the fair one being described in far more minute detail than is usual even in the most sentimental of English novels, or a tale of a lion, which, I must confess, interests me far more than the love tales. I remember that, on this particular night, one was told of a much more horrible character than any I had heard previously; and, as Hamed assured me, was undoubtedly true in its principal facts, though possibly not in all its details. It ran very much as follows:—

. . . .

After listening to these and similar narratives, which, perhaps, interested me more than they will you, from my having heard them by the light of a blazing fire, surrounded by a belt of trees barely visible on the edge of the black darkness behind them, until I was tired, I lay down with my head and shoulders inside my tent and my feet projecting towards the fire, and was soon sound asleep. I don't know at all how long I had been so before I was roused by something, and felt a pain in my head, and directly afterwards I received a blow on the head through the side of the tent, which made me think for a moment that I had been struck by an iron bar with claws at the end which I carried with me in my waggon; but in an instant the idea flashed across my mind that it was a lion which was sniffing at me through the back of the tent. To have called out would probably have led to his tearing down the slight barrier between us, and in that case your correspondent would, probably, by this time have been, to a certain extent, converted into a lion, and be wandering about among the mountains in search of an ox, or some little trifle of that sort, for his evening meal; and I should have been deprived of the advantage and you of the pleasure of seeing my negatives in England; fortunately, however, though a cold perspiration burst out on every part of my body, I merely withdrew my head quietly from the side of the tent, and stretched out my hand in search of Hamed, but without finding him. I hardly knew what to do. If I remained where I was without moving, there was the probability of the beast tearing up the tent and dragging me through. On the other hand, an attempt to move closer to the fire would probably be detected, and the lion has the same characteristics as the cat, and would doubtless have sprung upon me in that case, and have carried me off. While hesitating what to do, the animal, most likely from not being able any longer to feel anything through the wall of the tent, must have turned away, for after what was in fact but a few moments, but which seemed a very long time, there was a terrific shriek, followed by a low, deep growling, then a shot, and a louder growl. I felt about for my revolver, which I had placed beside my head before going to sleep, and creeping round the tent I saw the horrid beast standing perfectly still, with glaring eyes, and continuing the same low, deep growling, and holding in his mouth the body of a man, which he occasionally lowered on the ground as if with the intention of taking a firmer hold, but never entirely letting go of it. I saw by the direction of his look that he had caught sight of me, and so terrible are the associations connected with the beast in my mind that I dared not move or breathe for some seconds, when the thought suddenly occurred to me that it must be the body of Hamed that he held in his mouth. My liking for this man had become so strong that the desire to rescue or avenge him drove every feeling of fear out of my mind, and, with a steady aim, I fired at his body just behind the shoulder. Singularly enough, although I knew I had hit him, he merely gave a loud growl and remained stationary, without relaxing his hold of the Arab's body. How long he would have remained in this state of immobility I can't say, but I was just about to try the effect of a second shot, when a regular volley of guns was fired from out the darkness; the beast sprang forward towards me, almost at the same instant that I felt a sharp, stinging sensation in the upper part of my arm, and fell to the ground so close to me that I stepped back to avoid a blow from his paws in his death-struggles. They did not last long, and as soon as they were over I fetched a lighted brand from the fire, and first holding it to the face of the dead man to see who it was, and feeling much relieved at finding it was not Hamed, I waved it about as a signal for the others, that they might come with safety. They soon came and clustered round the body of the dead lion, some kicking it, and others spitting on and reviling it, and all of them claiming the honour of having killed him, a claim that they seemed far more interested in defending than in commiserating the fate of their dead companion. All the efforts we made to release the latter unfortunate from the jaws of the lion were unavailing without having recourse to our knives, and as there was not the least doubt of his being dead, for the teeth of the powerful brute were buried in his chest and back, we determined on leaving both bodies where they were until daylight.

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* Continued from vol. ii. p. 56.

The first thing I did when I awoke was to look for the bodies of the Arab and the lion. They were lying where the beast had fallen in the night, and his stiffened jaws still held the body of the man as in a powerful vice. The desire of preserving a record of the event for my friends in England to look at was too strong to be resisted, so we set to work; cut three pieces of timber to a point, and, having raised the lion to an upright position, kept him up by means of the pieces of wood. To conceal these, I planted a shrub here and there, which had the desired effect; and the result I obtained was a negative, the like of which, I believe, never was seen. The attitude is as natural as possible, and makes one shudder to look at it.

After the operation of taking this picture was concluded, I thought I might as well take another of the scene of the occurrence, but a glance at the number of plates I had with me induced me to refrain, as I feared that, if I did so, I might be prevented from taking a picture of more interest on a future occasion. Indeed, I find my stock of collodion getting low, and as to buying or making any before returning to Algiers, that is out of the question.

After our morning meal was finished, and my apparatus repacked, we started in search of game; we were not particular as to the kind, our chief object being to find an occupation which should give us sufficient excitement to prevent the time from hanging heavily on our hands. Your readers will, perhaps, be surprised to learn that the great amusement of the upper classes in England many years ago, hawking, is still practised by the Arabs. Great pains is taken in training these birds for the sport, and a good deal of barbarity is exercised on the animals which are employed for the purpose of teaching. Two of our party carried hawks, and soon after we had started from our camping place an opportunity was given to one of them to try his prowess on a hare. The animal was feeding on the border of an extensive plateau, and on our emerging from among the trees immediately behind her, she started off at speed across the open. The Arab threw off his hawk as quickly as possible, with the exclamation—"In the name of Allah!" a phrase intended to sanctify the game, which otherwise would not be lawful food, in consequence of its not being killed in the orthodox manner. The bird rose up in the air to a great height, while we went galloping along after the hare at coursing speed, but gradually losing ground, in consequence of the bushes that were sprinkled about; and, for my own part, I was too much engaged in looking after the hawk to mind where I was going, and if my horse had rolled over, as he was very near doing more than once, it is possible that it would have deprived you of this letter. Suddenly, I observed that the hawk, which had reached a height where he appeared to me to be stationary, began to descend with tremendous velocity, and, almost before I could pull my horse up to get a steadier view of what took place, came right upon the hare like a thunderbolt, the animal rolling over and over like a ball, in consequence of the speed at which it was running when it received the blow. On my reaching the spot the hare showed no signs of life, although the bird was busily engaged in tearing out its eyes.

All this has not much to do with photography, has it? Yet, if any photographers come out here this summer—and no doubt they will—they will not be likely to find anything more interesting to write about; for I conceive that your readers would not care to read how I sometimes find that the negative is deficient in sharpness; how I sometimes find that I have exposed too long, and at others too short a time, though the actual length of the exposure has been precisely the same, and the circumstances under which the exposure took place, identical; followed by ingenious speculations as to the cause or causes, all more or less wide of the truth. All this might be both interesting and perhaps useful, if I were in England, but would be of no sort of use writing from this country. As to the real difficulties under which any of my brethren in the art would labour, in the same situation in which I am placed, I feel that their native ingenuity would enable them to get over them in the same way that I do, viz., by adopting an expedient suitable to the occasion. C. A.

Miscellaneous.

Discoloured Chloride of Silver.—M. Cavalier has obtained chloride of silver in a similar dark state to that which has been exposed to the light, by dissolving recently precipitated chloride of silver in ammonia, and passing chlorine into the solution. The usual decomposition of the ammonia takes place, with evolution of nitrogen and elevation of temperature. Ultimately the liquid becomes turbid, and the chloride of silver is precipitated, first, as a grey powder, and, when the ammonia is entirely decomposed, as a violet powder. This precipitate is entirely soluble in ammonia, and is precipitated in a perfectly white state by nitric acid. If 20 grains of it be decomposed by zinc and dilute sulphuric acid, it yields 15 grains of silver—exactly the quantity yielded by 20 grains of white chloride of silver. Hence, the difference of the chloride in these two states cannot be referred to difference in composition, but solely to some variation in molecular arrangement.—*Journal of the Royal Institution*, vol. i. p. 393.

Phonautography.—In another part of our columns will be found the details of a very singular discovery of M. L. Scott, by means of which sounds may be made to record themselves, whether these sounds are those of musical instruments, or emitted by the voice in singing or speaking. Professor Wheatstone, during his recent visit to Paris, was invited by the Abbé Moigno to inspect the papers on which these sounds had printed themselves, and is said to have been greatly surprised and pleased with what he saw. The mark produced on the paper by a particular note is invariably the same; so, also, if a person speaks, the tone of voice in which he speaks is faithfully recorded. As yet no practical advantage has been obtained by this discovery; but M. Scott is sanguine that, in course of time, he will so far improve his apparatus that it will be capable of printing a speech, which may be written off verbatim, to the great saving of the labour of parliamentary reporters.

The Moon seen through Lord Rosse's Telescope.—In 1846, the Rev. Dr. Scoresby had the gratification of observing the moon through the stupendous telescope constructed by Lord Rosse, at Parsonstown. It appeared like a globe of molten silver, and every object, to the extent of 100 yards, was quite visible; edifices, therefore, of the size of York Minster, or even of the ruins of Whitby Abbey, might be easily perceived if they had existed. But there was no appearance of anything of that nature, neither was there any indication of the existence of water, or of an atmosphere. There were a great number of extinct volcanoes, several miles in breadth; through one of them there was a line of continuance, about 150 miles in length, which ran in a straight direction, like a railway. The general appearance, however, was like one vast ruin of nature; and many of the pieces of rock driven out of the volcanoes appeared to lie at various distances.—*Curiosities of Science.*

Photographic Notes and Queries.

◆

IMPROVED DIPPER.

Sir,—In your last number, a Querist desires a dipper that shall not knock out the bottoms of glass baths. Lake Price's silver dipper is recommended, but I am afraid that C. D. would look very much in that physical condition that his initials indicate on opening the bill after ordering this implement from town, and discovering its cost to be £2 2*s.*, that being the price of the instrument named; as the ordinary dipper can be made for twopence, this discovery is rather startling.

A cheap dipper can be made, that attains the end desired, by cementing pure sheet gutta percha round the bottom of the ordinary dipper, so that a half tube is left between the bottom of the dipper and the glass bath on its introduction, violent concussion being thus prevented. Fig. 1 shows this arrangement:—*a* the glass stem, on to which is cemented the glass rest *b*; *c* the strip of gutta percha cemented round the arrangement so as to form the semi-tube *d*.

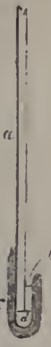


Fig. 1.

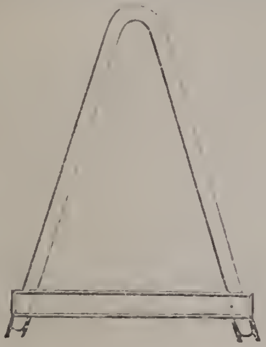


Fig. 2.

If the ordinary glass dipper adheres to a plate, I have always found it readily detached by letting it slide down the back of the plate, instead of trying to force the plate from the dipper; but the two objects desired may be attained by having a stout glass rod bent into the required angle, and so that its two arms are parallel, and a stout flat-edged bar of glass cemented across, so that ¼ inch of each arm is left projecting, on to which two caps of gutta-percha tubing, ½ inch in depth (or less), are cemented, as in fig. 2. This arrangement breaks the concussion, and the plate will not adhere.

S. Highley.

WASHING POSITIVE PRINTS.

Sir,—Anything which will facilitate the process of washing photographic prints after toning is of importance, particularly to amateurs whose time is often limited. I therefore send you the following suggestion, which, in practice, I have found fully to answer, and entirely to relieve the paper of the chemicals. After taking the print from the toning bath, rinse well in clean water, then place it on a smooth board slightly inclined, having a tap gently running over it, or a pail of water with a piece of India rubber tubing to form a siphon will do as well, and while thoroughly soaked, pass over the print a roller of India rubber pressed gently; continue this for a short time, and put in a pail of water to soak; after an hour or so, or whenever convenient, the rolling may be repeated for a few minutes, after which the print can be allowed to dry, and mounted without any danger of its fading. The roller is very easily made. Take a piece of vulcanised India rubber tubing, about 1½ inch diameter, pass through the centre a piece of wood, and then mount it on a handle like a printer's roller. Pardon my trespassing on your valuable space; but such a hint would, some time since, have been invaluable to myself.

A Benefited Reader of the "Photographic News."

PORTABLE DARK BOX.

Sir,—Having seen in your paper several suggestions for portable dark boxes, all of which may be very good, but, in my idea, are open to the objection of "weight," will you allow me to describe my "dark tent," which I am in the habit of constantly using, and the total cost of which was from 10s. to 12s.?

First I purchased (second-hand) a *child's carriage*—the old-fashioned kind with two seats. The seats were easily converted into boxes—the one to contain water-tight bath, collodion, developer, and fixer—the other, levelling stand, box of plates, and a can for water. The body of the carriage contains the camera, stand, and canvas cover.

Next I had made four supports, six feet high, with folding hinge in the middle (so as to fold into three feet), with the lower ends iron-pointed. These, when I wish to "pitch my tent," I thrust into the ground at each corner of the carriage. The cover for the whole is three thicknesses of glazed yellow calico, and one of black outside. This I simply throw over the four uprights, covering carriage and all; and, if the wind is high, fasten with a few pegs to the ground, leaving, of course, sufficient room to get under.

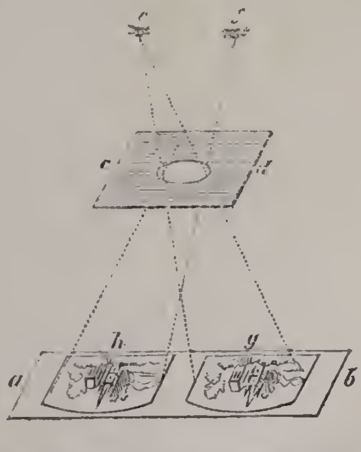
Such is my apparatus for wet collodion; but for dry, which I mostly patronise, it is still more simple. I then take only my box of prepared plates—*my carriage* and my calico cover. When I wish to change a plate, I put the box in the carriage, kneel, and throw the envelope over self and carriage, and am able to manipulate with the greatest ease.

I may just say in conclusion that I am persuaded any one who will try this plan, during the forthcoming summer months, will find a great difference in the amount of fatigue that they experience in *drawing* along their apparatus after them, and in *carrying* the same, however portable the box may be made.

Sarnia.

THE STEREOSCOPE.

Sir,—As a sequel to X. P. R.'s note on the stereoscope, in a recent "News," I beg leave to send you the following:—Take a piece of cardboard *c d* (see diagram) with a hole—about one inch in diameter—in the centre of it; hold the card in the hand and look steadfastly at an ordinary stereogram—but having the pictures reversed—through the hole, in such a manner that the eye *e* sees the picture *g only*, and the other eye *f* sees the picture *h*. The effect will, of course, be beautifully stereoscopic.



J. W. Fall.

CLEANING DAGUERREOTYPES.

Sir,—Can any of your correspondents inform me how to clean a daguerreotype from dust, which has got in under the frame? Not understanding that branch, I am afraid to touch it without advice.

Zingib.

QUERIES ON PHOTOGRAPHS IN NATURAL COLOURS.

Sir,—Perhaps Mr. Barrett, your correspondent in a recent number of the "News," would be kind enough to inform us what collodion and bath he used to obtain the photograph in natural colours he speaks of, and also any other particulars he thinks might have conduced to its production; by so doing he would much oblige me, and, I think, most of your subscribers.

Would not collodion transferred on albumenised paper (I mean plain albumen without any salt) do very well for printing positives by development? H. F. S.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

Sir,—Can any of your correspondents oblige me with an explanation of the cause of the following: when using the varnish in finishing the photograph on glass, it will often dissolve the picture entirely away—it often happens to me. I have inquired in vain as to the cause. H. T. (M.R.C.S.)

ANSWERS TO MINOR QUERIES.

Fading of Glass Positives.—*Cyanide* has had some glass positives which had been fixed with cyanide of potassium, washed, and then left to drain, almost entirely fade away in a few hours. The reason of this is imperfect washing. The greatest care should always be taken to wash away cyanide of potassium from photographs, as, if the least trace be suffered to remain, there will be danger of ultimate fading.

Cleaning Glass Plates.—*Thomas W——* has taken every precaution which he can devise to avoid the presence of spots in his pictures, and still they make their appearance, their numbers bearing apparently a direct proportion to the amount of trouble he has taken over the preparatory cleaning of the glass. This is very likely, as he informs us that he uses a silk handkerchief to polish the glass with, and takes care to have them both dry and warm. In this manner, the friction of the silk against the glass causes the latter to become very electrical, and thus to attract to its surface all the dust which T. W.'s exertions have so plentifully raised around it, and, of course, the longer the polishing process continues, the more dust will be raised, and the more the glass plate will attract it. If our readers would only use the plate-cleaning liquid which we gave at vol. i. p. 156, using a clean piece of wash-leather for the final polishing, and not paying *too* much attention to this latter part of the process, they would never complain of dirty plates.

Bending Glass Tubes.—*H. S. I.* asks how to prevent glass tubes from flattening together at the point where they are required to be bent. The tubes selected for this purpose should not be the very thin kind, but should have the sides of a tolerable thickness. It will be as well to endeavour to dispense with the use of a blowpipe, as, except in the case of hard German glass or tubes of great diameter, the operation can be very well effected with a spirit lamp, or, in preference, a fish-tail gas burner. Place the tube along the broad part of the flame, introducing it gradually so as to avoid danger of cracking it, and heating about two inches or more of its length, disregarding the deposit of carbon. The tube must be kept moving round on its axis all the time, and as soon as it is found that the glass is sufficiently soft to enable it to be bent (which can be told at once by a slight lateral pressure of the hand), it must be removed from the flame, and, in a steady, firm manner, bent into the required shape. The tube must be firmly grasped at each end, and, during bending, the two legs of the tube must be kept in the same plane, any tendency to one side or the other being easily seen and avoided if it be held so that the eye can look along the plane in which it is being bent. In very thin tubes, or such as are of larger diameter than about half an inch, there is generally experienced great difficulty in keeping the bore uniform throughout, the glass having a tendency to flatten at the bent portion. In the case of tubes of not larger bore than that just mentioned, a skilful operator may generally preserve the bore tolerably cylindrical, by placing his lips to one end and gently forcing air into it while bending, but for tubes of a larger diameter the following plan will be found preferable:—Fit a cork loosely into each end of the tube, and then fill it with dry, fine sand. Make a small charcoal fire, in such a way that about three or four inches in length of the tube can be raised to a dull red heat. Now, holding one end of the tube firmly in each hand, gradually introduce the part where the bend is wished to be in the fire, and rotating it as before, gradually bend it into shape. Care must be taken in this case not to have the temperature higher than is absolutely necessary, as, otherwise, the sand will fuse to the inside of the glass and roughen it. In all cases where tubes are to be bent it will be advisable to make that side of the tube which is to be the outside convex part of the bend slightly hotter than the other part, by allowing it to linger a little in the heat whilst rotating; in this w chance of forming an unsightly flat bend is diminished.

TO CORRESPONDENTS.

We feel it necessary to state that the remarks addressed to J. Heywood, in the last column, of p. 48, do not apply to Mr. John Heywood, the Secretary of the Chorlton Photographic Association.

W. D.—Your specimens are in advance of anything we have seen by the chromatype process, and seem capable of still greater improvement. We shall be glad to hear further from you.

A Practical and Hard-working Amateur.—1. The description of the method of taking stereograms from flat surfaces will be found in vol. i. p. 85 of the "Photographic News." 2. The collodio-albumen process. 3. It will shortly be advertised in our columns.

Ignoramus.—1. The entire lens, with brass mounting, &c., must be turned round, so as to face in the opposite direction, the component parts of it remaining untouched. 2. Your lens is not a good one.

T. Grey.—We cannot recommend any particular maker. Consult our advertising columns.

S. Taylor.—R. D. (Kirkaldy).—W. and D. D.—Received.

Captn. R. A.—The snowy appearance is a very common fault in stereograms, and is only to be remedied by employing a collodion which gives less intensity, and exposing the full time in the camera. We cannot recommend any particular person as a photographic printer.

H. R. Rump.—Received too late for the last number.

Aurora.—We are unable to explain the cause of the dark appearance from the description you give.

E. M.—The streaks may be removed by allowing the collodion to settle, and filtering and acidifying the bath.

One in the Country.—1 We do not know the orthodox formula for raspberry syrup. We are, moreover, of opinion that you would be likely to meet with more success in some other dry process; the collodio-albumen, for instance. 2. We know no more particulars than are given in the "News."

C. Williams.—The words "over" and "under" were, by a slip of the pen, transposed in the sentence. It will be corrected in an erratum.

H. Eldridge.—We can give you no more information than will be found in Nos. 28 and 29.

J. W. A.—*Nearly* neutralise your bath with carbonate of soda, and then add a few grains of acetate of soda; by this means you will avoid filtering the bath.

J. T.—We know of no other name.

M Henry.—Your letter did not reach us, or it would have been answered. Your print looks as if the silver bath had not been strong enough. We think if you increase the strength to 90 or 100 grains to the ounce, you will not meet with the difficulty as to colour.

J. Weaver.—We are unable to give you the required information. Apply to some journal specially devoted to the science

Φως.—1. See vol. i. p. 33. 2. You can do nothing with the collodion which has been poured into a nitric acid bottle.

J. P. C.—1. Add 2 grains of bromide of cadmium to each ounce of your collodion. 2. We do not know any other way to make red collodion but by adding iodine to it, or keeping it till it becomes red spontaneously.

Embryo will find all necessary information on the subject of putting together a portrait combination by consulting the index of our first volume.

Alphonso X.—If a plate be prepared with bichromate of potassa and gelatine, as in Mr. Talbot's photoglyphic process, and after exposure to light, it be soaked in water, the unexposed parts will swell and become sufficiently raised to enable an impression to be taken from it. This is the principle of the photogalvanographic process.

J. Partridge.—Received too late for the last list.

B. Abbott.—We shall be very pleased to see the "Cautions" you have drawn up.

Wallis.—Your bath is out of order; but you do not give any information which would enable us to say how to remedy it.

S. Taylor.—We have no means of distinguishing amateurs from other photographers, except by means of the information contained in their letters; consequently, although we are willing to carry out the request, that the club be confined to amateurs, it will be impossible to do so with any degree of accuracy.

F. Eraoh.—A good lens, bright light, and chemicals in as perfect order as possible, are necessary for working quickly.

Bengal.—Expose your bath to sunshine, in a flat dish, for an hour or two; then filter, and acidulate, if necessary.

Quæsitor.—All took place in the dark, as we distinctly stated. See our Paris correspondent's letter in to-day's "News."

Amateur wishes to know whether it is possible for him to obtain a $\frac{1}{2}$ plate camera and portrait lens on hire for the season. We do not know, but should think that if he were to advertise for such a thing, there would be no difficulty in obtaining what he wishes.

Carlo.—The spot is either caused by the developer being poured on at that place, or by a ray of light falling on the plate at that part through a small hole.

A Benefited Lady Amateur.—Our fair correspondent has raised our curiosity; will she not gratify it by forwarding the receipt?

J. Simpson.—We are much obliged by our correspondent's letter and views, and will give them a more detailed notice in our next. We should much like to see the other pictures mentioned, and will endeavour, if possible, to avail ourselves of our correspondent's polite offer.

Communications declined with thanks:—P.—Solem.—Gum A.—D. D.—Old Hand.—B. P. R.—Jane.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—F. A. N.—Mr. O.—B. R.—T. K.—M. R. B.—B. X. O.—Cato.—Καλος.—Jamieson.—Experience.—Green Colour.—F. Y. T.—Coal.—M. R. I. A.

In Type:—T. B.—T. P. B.—M. D.—F. R. E.—Photos.—J. C. S.—T. J. B.—R. P. H. N.—W. L.—W. Hayes.

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THE PHOTOGRAPHIC NEWS.

Vol. II., No. 33.—*April* 21, 1859.

THE COMPARATIVE TRIALS OF PHOTOGRAPHIC LENSES.

BY T. GRUBB, M.R.I.A.

Permit me to offer some remarks and suggestions relative to the late comparative trials of the Voigtlander and Petzval lenses. There appears to be an increasing feeling, if not of a necessity, at least, of the desirableness of such trials being made, and it is evidently most important that they be conducted with every precaution to insure accuracy of result.

Such trials are by no means as simple a matter as many would suppose. In the instance before me considerable care has evidently been taken, and every endeavour made, to insure a correct result. It will, however, not unfrequently happen (and the present instance is, perhaps, not an exception) that *after-consideration* will show the experimentalist that some data, which it would have been desirable to have recorded, has been omitted, or that some condition (or property) of the apparatus which had been under examination has not been adequately provided for or recognised.

Before proceeding further let me explain that I by no means apprehend that the most rigorous examination would alter the verdict of the late trial. There would appear to exist a difference between the two lenses examined too decided for this. My object in penning the subjoined remarks, &c., is that of affording matter which may prove of use in future trials, and where the difference between two or more lenses is much less than that which we are led to conclude exists in the lenses forming the subject of the recent examination.

Taking, in the first place, the examination of the lenses, when arranged as portrait combinations, I find the recorded data to be nearly as follows :—The lenses were nominally of the same aperture and focus, one lens having three inches aperture, the other one-tenth more in area. The focal lengths (nominal or actual) are not stated, and, most likely, did not agree; the distance at which the lenses were placed from the screen (or objects) being equal, and two and a half feet. No mention is made of the extent of field covered (or attempted to be covered) in any of the experiments.

The first suggestion I have here to make is, that while such data may have been abundant for satisfying the parties engaged in the trial, the record of the trial would be much more generally useful if the data given had been fuller—had, in fact, included that which I have alluded to as *not* given. Trials, whether comparative or not, to prove generally useful, should be so recorded that they may be compared with other trials, made at a different place and time, and by other parties.

My second suggestion here is, that in all such trials it would be desirable, as a preliminary step, to *proportion* the acting apertures of the lenses, *pro tem.*, to their respective focal lengths. The manner of doing this with sufficient accuracy is usually at hand. Should the lenses to be examined differ much in focus, in such case focus them (by preference) upon rather distant (out-of-door) objects, but if they (the lenses) be of nearly equal focus, the length of an ordinary room will suffice; in the latter case, place the lenses as far from one end of the room as practicable, and focus them for two marks made so far apart on the distant wall that their images will be considerably asunder in the cameras. In either case, the cameras should be equi-distant from the objects. The images on the greyed surfaces or their distances will be directly proportioned to the focal lengths of the lenses. The next thing to be done is to bring the acting diameters of the lenses to the same proportion, by a temporary diaphragm of cardboard placed as close as practicable in front of the first combination. It may be sufficient to prepare one such diaphragm only, viz., for that lens whose aperture without it would be disproportionately large, but I would, in general, prefer to place a diaphragm before each lens. The diaphragms being not only of the proper proportionable apertures, but also these being somewhat smaller than the apparent apertures of the lenses, so that on placing the diaphragms and removing the focussing screens of the cameras, it will be seen that it is the temporary or cardboard stop, and not any permanent or internal diaphragm, which really limits, *pro tem.*, the aperture of the lenses.

I conclude that the two lenses recently under examination had field combinations of nearly equal diameter. In such case no further "stopping" would be required to bring them on a par for examination; but should lenses be under trial which, while equal (or adjusted, *pro tem.*, to equality) in other respects, *have field lenses differing much in their proportionate diameter;* then, before an estimation be attempted of the relative qualities of their *lateral* pencils, a temporary diaphragm should be placed close to the last lens of that combination which requires it, of such size as will equalise the acting diameter of its field lens with that of the other combination under trial.

The next point to discuss, in case of a difference of focus existing in the lenses, is the *respective* distances at which we should place the cameras (or rather lenses) from the objects. The simplest plan to adopt, and one sufficiently accurate when the foci do not differ much, is to place the lenses so that their images will be of equal size. But the more precise method, I apprehend, is to place the lenses at those distances respectively which will cause their images to be directly proportioned to their foci. If the latter plan be adopted, we should, in examining the degree of perfection of lateral images, compare the corresponding portions of the images, not a measured distance from the centre of the field.

I conclude that, in the recent trials, the lenses were of nearly equal foci, and that in placing the lenses at equal distances from the screen of objects, all was right *for so far;* but, if there be no great mistake in my estimate of the probable focus of the lenses, I consider that placing them at 2½ feet only from the screen, involved an oversight, and one which may have exerted an influence on the conclusions arrived at.

A portrait lens should be adjusted in its spherical aberration for the work it has usually to do, viz.—to take pictures distinctly of objects removed, perhaps I might say as a minimum, four times, and usually eight times its focus; and this it can be. Most photographers are aware that if they use the portrait lens in a reversed position in ordinary work, they cannot expect a distinct image. Now, assuming the principal focus of the lenses under trial to have been fifteen inches, and the distance from the screen as stated, viz.—thirty inches, then the conjugate focus would be also thirty inches, the objects and their images would be equal in size, and equi-distant from the lens, and the convergence of the rays at one side, and the divergence on the other side, of the lens would be equal. In short, the lens so circumstanced, would be placed midway (so to speak) between that of its best and worst position.

Now the effect of approaching a well-corrected portrait combination excessively near to objects, is to produce under-correction of the spherical aberration; and to show how this may have more or less affected the results arrived at under the late trials, it is only necessary to suppose that one of the lenses was more or less over-corrected in this respect, and the other under-corrected. Such two lenses might give equally distinct images under ordinary circumstances, while a very near and unusual approach to objects would improve the image of the first, and increase the indistinctness of the image of the second lens.

This communication has already exceeded its intended length, so I forbear sending the few remarks I have to make on the lenses arranged as view combinations, until a following week.

Dublin, April 13, 1859.

DEVELOPMENT OF AN IMAGE AFTER FIXING.

The following is the communication made by M. Davanne to the French Photographic Society on Mr. Young's experiments, published in the 'Photographic News,' vol. i. p. 166, and referred to at some length in an interesting letter addressed to us by Mr. Sidebotham, at vol. i. p. 173.

" The Journal of the French Society recently contained the statement (copied from the 'Photographic News') of a curious experiment made in England. Mr. Young has shown that a proof on albumen, or albumenised collodion, may be developed in broad daylight, by the ordinary agents, if care had been previously taken to fix it with hyposulphite of soda, so as to remove all the iodide of silver in the operating room.

"This experiment, which at the first glance appeared singular, deserved to be repeated—which accordingly has been done by M. Bayard and myself, each operating by himself, and under slightly different circumstances. While M. Bayard, after fixing his plate, left it to dry in broad daylight and did not develop it until the evening, I developed mine immediately after fixing. The results obtained were sensibly the same; and confirmed the experiments of Mr. Young. The tones obtained differed slightly from those yielded by the ordinary processes; they were redder, the development was slower, but it nevertheless attained great intensity.

" On reflecting on the different reactions which must be produced in this experiment, I have been led to the conclusion that, far from diverging from photographic theory, this new process only confirms it, and even enables the action of the light on the sensitive film to be demonstrated.

"In a communication previously made to the Society, I thought that the development of the photographic proof arose not from a subsequent reduction of the iodide of silver, but from a deposit made in virtue of a molecular attraction. I cannot offer a more convincing proof than that which Mr. Young here gives, since he begins by removing the iodide of silver, and afterwards develops the image by producing a deposit on the glass.

" It remains for me to demonstrate the cause of this molecular attraction, attributed by some to a purely physical modification of the iodide of silver; by others, to a commencement of separation between the elements iodine and silver; but by the majority to a real but invisible reduction of the iodide of silver, at first, perhaps, to sub-iodide, and then probably to metallic silver.

" Mr. Young's experiment may enable us to verify these hypotheses.

" If the iodide of silver had only undergone a purely physical modification, its solution by the hyposulphite of silver ought to annihilate all traces of the image; we see that this is not the case.

" But if there is a reduction into metallic silver, the development in open daylight is easily explained. The hyposulphite of soda removes the excess of iodide while leaving the metallic silver, and in the developing bath this causes the development of the proof. If it be really thus, every re-agent capable of attacking metallic silver ought to annihilate the image; now, it is sufficient to treat a fragment of a proof, previously fixed with hyposulphite of soda, with nitric acid, diluted with half its volume of water, and heated slightly, to promote the solution of the molecules of silver and hinder the development. The re-action will be the same with cyanide of potassium, iodised cyanide, or a solution of iodine in iodide of potassium, because all these bodies have an energetic action on metallic silver.

" This explanation, it is true, would be equally good if there had been a formation of sub-iodide of silver, afterwards divided by the hyposulphite of soda into iodide of silver and metallic silver. But why complicate the reaction by the presence of a sub-iodide, which hitherto has not been isolated, of which treatises on chemistry do not speak, and the existence of which is at least problematical? And, besides, the action of nitric acid is exactly the same before as after the hyposulphite of soda, and if we admit the presence of a sub-iodide, it is at least probable that the nitric acid would have no action until after the action of the hyposulphite.

" It seems that now the theory of negative photographic action may be described in a very simple manner.

" 1. *Reduction by light of a very minute part of the salts of silver to the condition of metallic silver.*

" 2. *Development of the proof in consequence of the deposit of new molecules of silver, furnished by the reducing bath, and fixed by virtue of the molecular attraction.*

" On the subject of Mr. Young's experiments, *La Lumière* makes the following remarks:—

" We know that when a sensitive film is once acted upon, the action continues to propagate itself even after the plate is removed into a dark place. If the light which has begun to act on the iodide of silver continues its action when it is no longer present, one may readily conceive that this latent action may have been able to modify the iodide of silver, in such a way as to render it insensible to the action of the hyposulphite of soda bath; that this iodide may be reduced to the metallic state, or to the condition of a *sub-iodide*. We are inclined to regard the phenomenon in the latter light, and we thus explain to ourselves why the image which, in Mr. Young's experiment, does not appear after the hyposulphite of soda becomes *suddenly* visible when submitted to the action of the developing baths. If the image, from the moment of contact of the light with the iodide of silver, is formed of metallic silver, we cannot conceive why it is invisible when once freed from the excess of iodide by the washing in the hyposulphite; and we cannot well explain to ourselves what the action of the developing agents can be. Hitherto we had believed that the object of their use was to lead to the image being formed solely of metallic silver. If this reduction was already completely affected, the image ought to appear after the hyposulphite bath, and the developing agents would be useless. It seems to us, therefore, more rational to explain the phenomenon in the following manner:—

" The light eventually reduces the iodide of silver to the state of metallic silver, but this phenomenon does not take place at once and suddenly; it is only accomplished in virtue of a series of partial decompositions, the more as the light is more intense, and acts on the iodide for a longer time. From this series of partial decompositions results at first a kind (*une espèce*) of invisible sub-iodide, after the hyposulphite bath, in which it is but slightly soluble, and which, in passing to the condition of metallic silver, changes with the greatest facility into this state, under the slightest influence of developing agents.

" We believe that this is the true explanation of all heliographic phenomena in which the salts of silver, are employed."

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

OF INSOLATION.

Regarded from a purely practical point of view, it is easy to define in a few words the act of insolation. This definition may be stated by saying that, under the influence of the luminous rays, certain argentiferous compounds become coloured; but, regarded from a theoretical point of view, it is a different matter, and the solution of this interesting question has hitherto remained doubtful. We will endeavour to throw some light upon it.

It is generally admitted that in this act of exposure the argentiferous compounds approach the elementary condition; but is this action shown in a complete separation of the elements, or by a mere augmentation of the basic element? In short, are new combinations formed between the argentiferous compounds and the substances which surround them? These are the questions to be solved.

One hypothesis alone has been announced on the first point, and some learned individuals, guided by induction more than by experiment, have admitted that in their action on the chloride of silver $Ag\,Cl$, the solar rays reduce this to the condition of sub-chloride $Ag_2\,Cl$; we shall demonstrate that nothing of the kind takes place, and that the extreme action of the light on this compound is to operate as a complete separation of its elements, by restoring it to a metallic state.

In the particular case of the production of photographic positive proofs to which we must now confine our attention, we find ourselves in presence of several substances:—1. A sheet of paper represented by pure cellulose; 2. a size whether added during the manufacture or afterwards, and generally formed of starch, gelatine, or albumen; 3. of chloride of silver; 4. of free nitrate of silver, of which the paper can be freed by proper washing.

We shall first examine in what condition these compounds stand in relation to each other at the moment when they are deposited on the sheet of paper; afterwards we will examine in what way the luminous action may be able to modify their respective functions.

The examination of the first case is easy enough, for these compounds are produced there by simple chemical reactions to which the sheet of paper serves as a support.

Let us first consider the sheet of paper; it will constitute, as we have just now said, a simple basis. Size is deposited upon it, and the same may be said of the chloride and the nitrate. A minimum portion only of these will adhere to the fibres of the cellulose.

Size, in presence of chloride of silver, constitutes a simple mixture; but, in respect to nitrate, it comports itself differently. Among others, albumen will form with nitrate of silver a white combination, insoluble, and very sensitive to light, which, as we have already shown, leads to a greater richness in silver of the sheet of paper, and, as a consequence, ultimately plays a part in the production of the proof. Nitrate of silver does not act in the same way on gelatine and starch; simply mixed together, no immediate combination results, and we insisted on this fact when we showed that these sizes exercised no influence whatever on the absorption of nitrate by the paper. Nevertheless, we have demonstrated by experiment, that these sizes greatly influenced the results; therefore we deemed it necessary to bestow a peculiar attention in marking the manner in which they would behave under the luminous influence.

Finally, and this is the only point which it remains for us to establish, the nitrate of silver in presence of the chloride forms no combination with it; it merely dissolves, as has been recently demonstrated by M. Riche, and as a consequence of this solvent action, it divides the mass in a more equal manner in the fibres of the paper.

Let us now examine the phenomena which will be produced when all these bodies shall be submitted to the action of the light.

The sheet of paper itself naturally occupied our attention in the first place, and we asked ourselves if, according to the interesting researches of M. Niépce de St. Victor, it could not, by storing up light, to use his own expression, influence the production of the proof; we have not found this to be the case, and we must even avow that no sheet of paper, whether sized or not, exposed to the light in a printing frame, and then passed in a nitrate of silver bath, gave us any appreciable result. Possibly we did not proceed in a manner favourable to our obtaining any; possibly the light was not strong enough; but in any case it may be affirmed that the insolation of the paper itself has no influence whatever in the production of the proof.

(*To be continued.*)

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* Continued from vol. ii. p. 3.

Critical Notices.

The Moon in the Stereoscope. Photographed by Herbert Fry.

The idea of a stereogram of the moon is at first sight calculated to surprise many who have not considered the subject; and even those who are best informed on such matters most probably have never seen one.

The mode in which a stereoscopic picture of the moon is obtained is, we need hardly say, by taking advantage of the moon's librations, which, for the benefit of our younger readers, we may explain is the result of the moon's motion in her orbit being quicker or slower at one time than another, while at the same time the rate of rotation on her axis is unvarying; so that we are able by means of the telescope to observe sometimes a little more of one side and then a little more of the other, alternately; and the same with respect to the north and south polar regions. The first to avail himself of this circumstance to take a lunar picture for the stereoscope was, we believe, Mr. Delarue, though whether he succeeded so well as Mr. Fry has done is a point on which we have heard different opinions.

Nobody can be more familiar than ourselves with the difficulties of obtaining a photograph of the moon of sufficient value to be used as a map; in which the mountains, craters, and other features of the moon's surface are rendered with fidelity. Mr. Fry, however, seems to have had peculiar facilities. The instrument he used was placed at his disposal by Mr. C. Howell, of Brighton. It was an equatorial telescope of nine feet sidereal focus, and about six inches and a half diameter of object glass, fitted with clock work, which, by means of governor balls, could be made to follow the apparent motion of the moon so exactly that to all intents and purposes she remained stationary while the photograph was being taken. The stereogram by Mr. Fry is a transparent positive, and, when seen by a powerful transmitted light, presents a distinct picture of the various features of the lunar surface; and is rendered of more value by the fact, that each picture is accompanied with a paper photograph in which the principal points are numbered and indexed.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

First Coat of Colour.—However simple the following may appear, it is the result of many experiments. At first it is a puzzle to even a skilful artist to convert a dark photograph, pale and death-like, with grey, harsh shadows, into the fleshy look of life, without injuring the resemblance. Some employ one method, some another; some try to kill the photograph by labouring at it, and thereby kill the likeness, as before observed. Having chosen the light copy, it is first to be pasted on hard thin millboard.

Then take Indian yellow, and crimson lake (the two brightest and most transparent colours we have appropriate). With these, in a thin wash, using a large camel's-hair brush, go all over the flesh in a light sweep, minding not to go over the same place twice while wet, as that would disturb the albumen, making the picture rough.

Here again a difficulty is presented, which completely stops the painter, and appears insurmountable at first: the albumenised paper is greasy, consequently the colour will not enter it.

We have tried washing with gum, with ox-gall, too; the colour does not work kindly over either, but looks dirty, spotty. The best plan is the following:—Take a large dry camel's-hair brush, wet it in a weak solution of isinglass, and with this go all over the photograph, previously to giving the wash of yellow and lake just mentioned, which the paper will now take, and will always receive freely afterwards.

The picture having received a first flesh wash, will dry in two minutes; then lay it, face downwards, on the clean plate glass, and burnish it, pressing heavily on the back with the burnisher, until the dead surface produced by this first wash is made to shine.

Next, with a colour made of Indian yellow and vermilion, wash thinly over the deep shadows in the flesh. This being semi-opaque, bright and warm, completely converts the dead-grey photograph into the semblance of flesh. Let this be carefully done, watching the effect, as it comes up, to see where it may be made a little warm without being too red; which, if necessary, do with a second wash of the same colour, observing that the shadows upon the cheek are to be made redder than upon the forehead.

Hair.—Afterwards give a wash for the lights of hair, which wash may be its local or normal colour; if brown, use vandyke brown; if black, use indigo first for the high lights, and, by the side of those high lights, sepia, with vandyke brown added for the shadows. If red hair, use venetian red, burnt sienna, and gamboge for the general colour, with another wash afterwards of same, adding vandyke brown for shadows.

Hair is sometimes so highly reflective, as to be grey or purple in the high lights; black hair, nearly blue; these grey lights may be added with body colour thinly in the finish.

For flaxen hair, use Roman ochre; more ochre in light, more sepia in shade; bright light inclined to a lilac, pale.

Chestnut hair. Burnt umber, lake, and sepia, rather purple in deepest shadows.

Red hair. Crimson lake, Venetian red, and burnt sienna. Burnt sienna alone imitates some colours of red hair, but it is rather foxy; the colours first mentioned may be modified with Roman ochre if required rather yellow. When a sitter has this coloured hair, endeavour to introduce some colour about it to destroy the disagreeable appearance of redness, such as white or pink ribbons; but never have blue if it can be avoided, as such a colour, by contrast, will increase the redness.

Dark brown hair is represented by sepia, adding a little lake in the shadows; and in the high lights, purple.

Grey hair, reflecting some portion of blue, comes out in the photograph lighter than in nature. Sepia and cobalt make a general tint, to be varied by burnt umber and neutral tint as the case may be. As people do not care to have their hair appear too grey, white may be employed in the vicinity to destroy it; but black increases its whiteness by opposition.

Auburn hair, burnt umber, lights purple.

In finishing, a few stray hairs may be painted over the background, beyond the general masses of hair, to give an appearance of finish; and the same with a few hairs upon the face, if admissable.

It is not necessary to say more on this point, as there are plenty of works which show the compounds of tints correctly; the present being intended as an application of those principles to painting photographs.

(*To be continued.*)

Dictionary of Photography.

CEROLEIN—that constituent of bees' wax which is soluble in cold alcohol. It constitutes about 5 per cent. of the wax. M. Geoffray has employed this body in photography, by extracting it from wax by means of boiling alcohol; and, after allowing the other constituents to crystallise out on cooling, filtering off the clear solution of cerolein. This solution is then iodised, as in the waxed paper process, and then sheets of thin French paper are dipped in and hung up to dry. They are then to be treated, in their subsequent operations, exactly as in the waxed paper process. The finished negative is, however, to be re-waxed before being used to print from.

CELLULOSE.—This forms the groundwork of most of the vegetable kingdom. It occurs under the greatest diversity of forms, such as cotton, linen, pith, rice-paper (the pith of the *aralia papyrifera*); and in a more impure state, together with ligneous tissue, in the form of the shells of the filbert, cocoa-nut, and vegetable ivory. In the laboratory, pure cellulose is met with as finely-carded cotton, linen, and Swedish filtering paper. It is white, tasteless, and amorphous, insoluble in water, alcohol, and ether. This body has hitherto been regarded by the photographer with interest, as being the starting point in the preparation of pyroxyline, or gun-cotton, which is, chemically speaking, *cellulose* in which a certain number of equivalents (7, 8, or 9) of hydrogen are replaced by the same number of equivalents of nitrous acid. Now, however, cellulose seems to promise to become of more immediate interest, as Dr. Schweitzer has succeeded in discovering a solvent for it, which will leave it unchanged on evaporation. The particulars of this remarkable discovery were given in the "PHOTOGRAPHIC NEWS," vol. ii., p. 39.

CHLORINE.—An elementary body, gaseous at the ordinary temperature, of a pale yellowish green colour, and a powerful irritating odour. It is very prejudicial to health if breathed; in fact, in the undiluted form it proves instantly fatal to animal life. It dissolves in water, and communicates to it its peculiar properties. It exercises a very powerful action on vegetable colours. It combines with the other elements to form chlorides, the most important of which we shall proceed to describe. In its uncombined state chlorine has hitherto been unemployed in photography, except in M. E. Becquerel's researches on obtaining photographs in the natural colours.

CHLORIDE OF AMMONIUM.—A salt containing one equivalent of chlorine, and one of the hypothetical metal ammonium. It is commercially know as *sal ammoniac*, where it is met with under the form of hemispherical, translucent masses, having a fibrous crystalline fracture. Those lumps which are coloured brown, owing to the presence of iron, should be rejected. It is soluble in water and alcohol, and is used by photographers in the preparation of positive paper, instead of chloride of sodium. In our opinion, however, the latter is the preferable salt of the two, as we have previously stated in the "PHOTOGRAPHIC NEWS," vol. i., p. 252. It may be made by adding hydrochloric acid to a solution of ammonia, and evaporating to dryness on the water bath; as, however, it can be purchased of very good quality at a small cost, it will seldom be worth while for the experimentalist to prepare it for himself. Its purity may be roughly told by heating it to a dull redness on a clean fragment of porcelain, or a piece of platinum foil. When pure it should volatilise in a white smoke without leaving any residue.

CHLORIDE OF BARIUM.—A white crystalline salt composed of equal equivalents of chlorine, and the metal barium. It has been used by Sir William J. Newton for washing over paper on which pictures are subsequently to be printed by development. It is imagined that its beneficial action is owing to its uniting with or hardening the size in the paper.

CHLORIDE OF BROMINE.—A compound sometimes used in the daguerreotype process. It is prepared by passing a stream of chlorine gas to saturation through bromine, contained in a tube immersed in a freezing mixture. The compound is formed when the chlorine is no longer absorbed and the bromine ceases to become warm. It is a very volatile liquid, and should consequently be kept in a well stoppered bottle, in a cool place.

(*To be continued.*)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS.

Q. What produces the change of colour in the positive proof?

A. The action of light on the chemically-prepared surface of the paper.

Q. How is the nature of this change usually explained?

A. Most photographers state that the black substance which results from the action of light on the chloride of silver, is a sub-chloride; that it is this chloride of silver which forms the image; others are of opinion that it is formed by metallic silver. Both theories are perfectly consistent, as the image which subsequently to the fixing process is formed by metallic silver, may certainly be before that process a sub-chloride of silver.

Q. Is the alteration which takes place inherent to the image itself?

A. No; it is produced by the manipulation to which it is submitted, and which considerably affects its nature.

Q. How has this been ascertained?

A. By a careful analytical process conducted by gentlemen connected with the French Photographic Society.

Q. How was this process conducted?

A. By a very simple arrangement, by which the photographic proof in various stages of development was submitted to chemical analysis.

Q. What was the result of the investigation?

A. The general opinion, as the result of the inquiry, was that the positive photographic image is formed by the sub-chloride of silver, slowly changed by the hyposulphite, the researches being conducted with chloride and sulphuret of silver.

Q. What were the first steps taken in this analytical research?

A. The first inquiry was directed to the condition of the silver on the positive paper, in which no transfer had been taken. For this purpose a sheet was prepared in the bath of salt and water, and in the nitrate bath, exposed to the action of light, washed, fixed with new hyposulphite of soda, washed again, dried, and analysed.

Q. What was the result of that analysis?

A. The paper was not found to contain any trace of sulphur, which proved that there was no residue of the hyposulphite. It contained 62 parts of silver, and 1 part of chlorine, thus showing that the image was not formed by reducing the chloride of silver to a sub-chloride insoluble in hyposulphite of soda.

Q. What was the next step in the investigation?

A. The next step was to ascertain how far the hyposulphite acted on the silver in reducing it to a sub-chloride. For this purpose, a certain quantity of chloride of silver was placed in a capsule, and shaken at intervals, so as to bring every portion of it under the direct influence of the light. The silver turned black; was afterwards washed with water, then with new hypo., then again with water, finally dried, mixed up with carbonate of soda, and reduced by heat. The result of this investigation proved that the residue, after the washing with hyposulphite of soda, *was not* a sub-chloride, but pure silver. The ordinary experience of photographers verifies the result of this experiment, that a sheet of positive paper exposed for a long time to the light, at last presents on its surface the colour and character of metallic silver. The partisans of the sub-chloride theory admit the insolubility of sub-chloride of silver in nitric acid. But it has been ascertained, beyond all doubt, that a proof, the surface of which ought—according to the theory—to be a sub-chloride, and therefore insoluble, disappears on the application of nitric acid.

Q. How was this investigation continued?

A. The inquiry was next directed to the real action of the hyposulphite of soda on the positive proof, as it is argued that pure hypo. may leave sulphur in the proofs which is expelled by the subsequent washing. By pure hyposulphite of soda is meant that which has not been used before, and which contains neither acids nor salts of silver. Here the conductors of the experiment encountered considerable difficulty. In numerous experiments repeatedly made on sheets prepared with chloride of silver, fixed and thoroughly washed, they did not find that the sulphur equalled in quantity that which is contained in the ordinary paper of commerce; they supposed that the sulphur, therefore, was not left by the new hyposulphite of soda, which was, perhaps, expelled completely by the water baths, and could not, therefore, be the cause of the destruction of the proof.

Q. Is the careful washing of the proof unnecessary?

A. No, the photographer cannot be too particular about it, as it is certain that if the proof has not been well washed it will still contain some traces of hyposulphite of soda, which suffice in a short time to obliterate the photographic image, wholly or in part.

Q. What was the next step taken in the examination?

A. To discover the chemical condition of old proofs, proofs on which photographic images had been taken. A selection was made of those proofs from which the image had been almost entirely effaced, and after they had been soaked for some time in old or acid hyposulphite, it was found that they changed to a dark violet; they were afterwards immersed for twenty-eight hours in distilled water. All the proofs contained a large quantity of sulphur, some more and some less, but most of them a proportion equal to that of the sulphite of silver. It was ascertained that between a common proof and a proof fixed in the ordinary way there existed a considerable difference: one contained sulphur and the other did not, from which it appeared that the sulphur had much to do with the alteration of the proof. An effort was then made to ascertain in what manner the sulphur acted on the proof, and for this purpose five baths were prepared:

1. A weak solution of sulphide of ammonium.
2. A solution of hydrosulphuric acid.
3. A solution of hyposulphite of soda mixed with a little acetic acid.
4. A bath of hydrosulphuric acid gas.
5. A bath of hyposulphite of gold and soda (sel d'or of the photographers) to which was added a small portion of sulphur.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, April 19, 1859.

The great photographic talk of the day is the opening, at the Palais de l'Industrie, of the third public exhibition of photography, organised by the *Société Française*, which, as we announced in our last letter, was to be opened punctually on the 15th. The society has been too punctual—probably that the photographic exhibition might vie, in this important quality at least, with its gorgeous sister, the exhibition of paintings—for the whole of the work is not finished, many pieces are still in the act of being attached to the walls; and, what is worse than all, the catalogue, which was only given to the printer on the 1st of April, has not yet made its appearance, so that many fine proofs, whose authors have been too modest to print their names underneath them, or who have contented themselves with simply inscribing their initials, will not find themselves at the top of the ladder of fame by a "lift" from our pen until the catalogue has appeared.

Among less retiring photographic artists, and foremost among those whose names salute us at every corner of Paris, whose cards and addresses are—and very properly—carefully applied to each group of photographs they exhibit, we will mention M. Nadar. He has exhibited a whole gallery of portraits and fancy pictures (which we might perhaps entitle *photographies de genre*), the greater portion consisting of most excellent portraits. Here are figured some of the more remarkable men of the day, and M. Nadar's "Gallerie des Contemporains" is well worthy of notice. In it we have portraits of the composer Rossini, the chemist Pelouze, the politician Guizot, the novelist Sandeau, &c.—most admirable photographs. In studying this collection to-day we were struck with a peculiarity which, we might almost say, *characterises* at once M. Nadar's figures. In most cases neither hands nor arms are anywhere to be seen, both are most ingeniously hidden. This is so cunningly done that the spectator does not miss them in the least in a single proof; but it strikes us immediately when we see some 50 or 100 proofs side by side. Ladies are elegantly wrapped in cloaks or mantillas, or they are grouped in such a manner that the hands at least are totally hidden.

This circumstance quite banishes any chance of failure by the photographic reproduction of hands and arms, which so often completely spoil the best of photographs by their terrific proportions, or their unsuccessful development.

M. R. J. Bingham, a Paris photographer, with an English name, will perhaps carry the day, in this exhibition, by his magnificent copies, or, to use the French term, *reproduction*, of pictures. What a splendid collection of proofs! All the finest pictures of Paul Delaroche most exquisitely copied—every feature, every line, every shade is there—and for a moment we actually forget the want of colour. Indeed, colour could not add to the beauty of these proofs. M. Bingham has exhibited a series of *chefs-d'œuvres*. They are *chefs-d'œuvres* of the artists whose pictures he has copied, and they are *chefs-d'œuvres* of photography. Among the more remarkable is a reproduction of the famous "Hemicycle," painted by Paul Delaroche, in the *Palais des Beaux Arts*, representing all the great artists. In M. Bingham's proof every portrait is as perfect as in the original painting.

Here we have another example of the immense advantages of photography in certain circumstances. What pencil, however practised, could copy from the "Hemicycle" the figure of Vandyke, of Rubens, or of Raphael, for instance, and make this figure a true "reproduction" of such an artist as Paul Delaroche? But photography gives us every line as it was drawn by the great master himself.

M. Michelet, of Paris, has also exhibited a great number of photographs of pictures, some of which are very beautiful. A few of them are copies of pictures now exhibited for the first time in the large exhibition, to which we alluded above. Such is the "Siege de Balaclava," &c. We have a friend in the North of England who would not give a straw for a picture unless there was a *soldier* in it. The "Siege of Balaclava" would probably suit his taste. "La Cassacia" (Venice, 1560), a well known painting by De Beaulieu, is such an admirable piece of composition that it did not require M. Michelet's talent, as a photographer, to make a most beautiful photograph of it.

M. Desmaret has exhibited a considerable quantity of portraits. Now, we perceive that as photography progresses, as its manipulations become more thoroughly understood, both chemically and artistically, it becomes more and more difficult for the impartial observer to give a true idea of the merits of a photographic production—its superiority or inferiority when compared with others. M. Desmaret's portraits are good, though not equal to Nadar's, perhaps, in an artistic point of view.

M. Braun, of Dornach (Haut Rhin), who is an artist as well as a photographer, has embellished our exhibition with some magnificent views—some of the largest we ever saw. The fine tone of his productions, the lights and shades, together with the beauty of the minute details—all produce a very charming effect. His collection consists principally of Rhenish scenery.

M. Braun has a powerful rival in the person of Dr. Lorent, of Venice, whose photographs this year are even finer than those which made such stir at the Brussels Photographic Exhibition, in 1857. His proofs are on *albumenised paper* from *negatives on waxed paper*; they are very large. The most beautiful is, perhaps, his group of "Date Palms." The strong tone of some of Dr. Lorent's interiors is very remarkable, and places him at once among the first photographers of the day.

Disderi and Co., of Paris, have exhibited a great variety of portraits, copies of pictures, small portraits for visiting cards, &c. We remark in this collection a case of curiosity proofs, among which are two examples of colours produced photographically, and in this respect are worthy of attention. Probably, when these were first produced, all the natural colours were present, but have gradually faded, until only two or three tints remain. The first is a small full-length portrait of a damsel, framed in a brooch. The dress consists of dark and light coloured stripes, the cloth of the table, near which she is standing, is of a reddish brown, and the wall which forms the background is of a yellowish tint. The second is a view of the "Invalids:" the building is of a pinkish colour, not very far wide of the natural aspect of this edifice on a sunny day; and the sky of the most magnificent blue. This proof is very remarkable; it is taken on enamel.

M. Adam Solomon, a sculptor, exhibits a series of very beautiful portraits, which deserve a longer notice than we can afford to them to-day. In most of his proofs we recognise the action of salts of gold, which accounts for their peculiar dark colour, and which, in some instances, produces an admirable effect, but, in general, casts an unnecessary degree of gloominess over photographic productions which would otherwise be considered very good.

As usual, MM. Bisson's monumental photographs surpass anything of the style we ever saw. The most beautiful subject in their collection of this year is a portrait of the Empress, after a picture by Winterhalter. They exhibit, also, two reproductions of engravings, which it would be impossible to distinguish from the originals, unless chemical means were employed.

We will notice to-day, *en passant*, some pretty landscapes exhibited by A. Civiale. They consist of mountain scenery, cascades, ravines, &c. The spots are chosen with much taste and the execution merits much praise. We have here a large panoramic view of the Pyrenees, which, considering the gigantic undertaking, has been tolerably successful. Then, a view of the Maladetta, of the torrent de Pique (Valée de Luchon), &c., which give an admirable idea of the scenery in the Pyrenees.

M. Claudet, of London, considering the magnificent establishment he has in Regent-street, has a comparatively poor collection here. A reproduction of Landseer's "Bolton Abbey" is pretty good; and the same may be said of the portraits M. Claudet has exhibited.

Roger Fenton, who shone so brilliantly at the Brussels Exhibition of 1857, has not answered our expectations. Among the proofs he has exhibited, we will notice, as one of the finest in the whole exhibition, his "Glastonbury Abbey." His "Nubian Girl carrying water," also deserves attention.

Mr. Robinson, of Leamington, has sent to our exhibition some very poetic and some very melancholy subjects. His photographs deserve much notice. Some of the few he has exhibited here are exquisite. His "Sulee," a young girl seated carelessly in an old chair, shows considerable taste, art, and execution. Altogether this is about one of the best photographs we ever saw.

Mr. Maxwell Lyte exhibits a great number of landscapes, which we have no time to notice to-day; and the views of the country around Pernambuco by M. Stahl give us an excellent idea of tropical scenery.

There is yet much to notice. Altogether this may be said to be one of the finest exhibitions of photography ever organised, and does much credit to the *Société Française*. We shall return again to it in a future letter.

At the last meeting of the *Société Française de Photographie* a report was read by M. Paul Perrier on the proofs, &c., presented as competitions for the prize of 10,000 francs, to be given by the Duc de Luynes to the inventor of a process by which the black portions of positives shall be as solid and unchangeable as the carbon of lithographic or printer's ink.

The competition for the principal portion of this prize, 8,000 frs., is prolonged for three years more. To-day the committee thinks proper to award the other 2,000 frs., which will be divided between Messrs. Poitevin, Pouncy, Salmon and Garnier, and Girard and Davanne. M. Poitevin, who appears to have been the first to have conceived the idea of positives in pure carbon, receives a gold medal, value 600 fr. To M. Pouncy on the one hand, and to Messrs. Salmon and Garnier on the other, the society awards a silver medal, "for having, by applying the idea of M. Poitevin, obtained positives in pure carbon with at least a partial success." Each of the two silver medals is of 500 frs. value; and to Messrs. Girard and Davanne a medal of 400 frs. value.

We have a new process, by M. Niepce de St. Victor, for obtaining red, green, violet, and blue photographs.

Here is a description of the process in a few words:—

Red Proofs.—The paper is prepared with nitrate of uranium at 20 per cent.: it is plunged for 15 or 20 seconds in the solution, and then dried by the fire in a dark place. The length of exposition in the camera depends on the force of the sun, &c.; it varies from 10 minutes, when the sun is bright, to an hour or more on dark days. On leaving the camera the proof is washed for some seconds in tepid water (50° or 60° centigrade); it is then plunged into a solution of red prussiate of potash at 2 per cent. In a few minutes the proof acquires a fine blood red colour. It is then washed and dried.

Green Proofs.—The red proof is plunged for half a minute into nitrate of cobalt; it is withdrawn but not washed. The green colour is developed by holding the proof to the fire. It is fixed by placing it for a few minutes in a solution of sulphate of iron at 4 per cent., acidified with 4 per cent. of sulphuric acid. It is then washed and dried.

Violet Proofs.—The paper is prepared as above with nitrate of uranium. On taking it from the camera it is washed in warm water, and the colour developed by chloride of gold.

Blue Proofs.—The paper is prepared with red prussiate of potash at 20 per cent. and dried in the dark. The proof is withdrawn from the camera as soon as the insolated parts acquire a bluish tint; it is then placed for five or ten seconds in a solution of bichloride of mercury, afterwards washed in water, and then treated with a warm solution of oxalic acid, washed three or four times and dried.

PEOPLE ON THE MOON.

To the Editor of "The Photographic News."

Sir,—A paragraph appeared in your issue of the 17th of March, in which it is stated that an Italian, after six years' labour, had, by means of photography, and the microscope, been enabled to see animated beings on the moon—and that some of these beings approach the human shape, and go unclothed. That people on the moon—if there be any—should go unclothed, is no remarkable phenomenon, inasmuch as about *one-half* of the people on this earth wear little or no apparel. The first impression that would strike the minds of the majority of your readers on running over the paragraph referred to, would be that it is a hoax—a sort of repetition of the extraordinary moon story of about twenty years ago. Those of your subscribers who know anything of the telescope, of photography, and of the microscope, would perhaps not be quite so incredulous. I remember, two years ago, mentioning to a friend the probability of small objects on the surface of the moon being rendered visible by means of the telescope, photography, and the microscope. This week, during a conversation with one of the most eminent physicians in Newcastle, I found that he had, three years ago, expressed a somewhat similar opinion. To hope to see small objects in the moon by means of the telescope *only*, seems to me to be "hoping against hope." One thousand is about the highest magnifying power a telescope will bear, and it is equivalent to looking at a lunar object 240 miles distant, a distance at which an object 250 yards square would appear about one-eighth of an inch in diameter. Immediately on reading the paragraph to which I have referred, I made the following calculation. The moon is 240,000 miles from the earth; a telescope with a power of 1,000 will present objects on the surface of the moon as if they were 240 miles distant. If it be practicable to take a photograph of the moon, through the eye-piece of a telescope, magnifying 1,000 diameters, and there be applied to that photograph a microscopic magnifying power of 1,000, which is far from being the highest power used, then objects on the moon will present themselves to the microscopic observer as if they were only 422 yards distant, a distance at which small objects, such as a man or any ordinary-sized animal, might easily be recognised and the general contour perfectly distinguished. The only important practical difficulty is to obtain a clear photograph through a powerful eye-piece, and if your skilled photographic readers can assure me of this, I'll undertake to show, with distinctness, objects on the moon a trifle larger than a rat.—I am, yours respectfully,

T. P. Barkas.

Photographic Societies.

Photographic Soirée at the Mansion House.

The Blackheath Photographic Society's soirée, or rather the soirée given by the Lord Mayor to the society at the Mansion House, came off on Friday evening, and was a most decided success. The company present were by no means all photographers: among them we observed many scientific men of high repute, members of parliament (who must have found it infinitely more agreeable to be enjoying the hospitality of the Mansion House, and admiring some of the finest photographs we have ever seen, than listening to dull speeches in the other house), as well as most of the civic dignitaries.

The company, on arriving at the Mansion House, were introduced to the Lord Mayor, the Lady Mayoress, and the President of the Blackheath Photographic Society (Mr. Glaisher, F.R.S.), after which each individual was at liberty to wander about the Egyptian Hall and adjoining apartments, and admire the numerous beautiful photographs suspended along the walls, and the no less interesting pictures in the stereoscope. The hall was most brilliantly lighted, and the animation imparted to the general aspect of the company by the presence of ladies in gay dresses, which, owing to the present fashion, were seen to great advantage, made it one of the prettiest sights imaginable. Add to this the charm of music at short intervals, and an abundant supply of delicacies for the restoration of those whom enthusiastic admiration of Delarue's wonderful stereogram of the moon, Glaisher's photographs of snow crystals, Williams's portraits, and other pictures, had somewhat exhausted, and it will easily be understood that the whole affair was as well conducted and agreeable as possible. The number of guests present was not so great, although we imagine there must have been nearly a thousand present, but that everybody was able to circulate with ease and comfort—no unimportant ingredient in contributing to the pleasure of the evening, as all who are in the habit of attending evening parties will readily admit.

The advantage of meetings of this kind in establishing friendly feelings among photographers is too great and evident to be disputed: more especially when they are attended with so many agreeable accessories, which, thanks to the Lord Mayor, rendered this the most delightful photographic soirée ever given.

THE FRENCH PHOTOGRAPHIC SOCIETY.

THE chair was taken at the last meeting of the above Society, by M. Regnault, its president.

After the names of the newly elected members had been read, the Chevalier Dubois de Nehault presented a picture to the Society. M. Laulerie presented, on the part of M. Gabriel de Rumine, a series of pictures taken by him in his journey with the Grand Duke Constantine. M. Delahaye presented, in the name of M. Severin, of Dusseldorf, several portraits of large dimensions, taken with one of Voigtlander's lenses. M. Bernard also presented some pictures.

A letter was then read from M. Lenoir, on the subject of linseed for removing silver stains from the fingers. He had tried it in all kinds of ways, and pronounced the whole thing to be a humbug; an opinion in which several members entirely concurred.

A note was then read which had been forwarded to the Society by M. Jobard, of Dijon, on a new process for fixing positive proofs, which is as follows:—

"The proof once taken is placed in a neutral hyposulphite bath, composed of 20 parts to 100 of water, and left in it about twenty minutes; then washed, and, when dry, placed in a bath composed of 3 parts of bromide of potassium, 2 of iodide of potassium to 100 of water, and then dried.

"Up to this time the proof has not changed in tone. To tone it, it is placed in a bath composed of 15 grains of sel d'or to a little less than a quart of water; the toning proceeds then rapidly, passing from red to brown, then to violet, and finally to an intense black; but the action may be stopped at any moment, and the proof is perfectly fixed.

"Two proofs obtained in this way, which have remained exposed for the last eight years, in an open gallery, to all the vicissitudes of temperature, damp, cold, and tropical heats, have remained unaltered, while other proofs fixed and toned to a black by the ordinary process, have completely disappeared.

"Proofs fixed by the new process have resisted the vapours of hydrosulphuric acid."

The thanks of the Society were accorded to M. Jobard.

The following note from Mr. Maxwell Lyte was then read:—

"I believe that in all the examinations that have been hitherto made on the alterability of the positive proof, two causes which may often account for the alterability of the proof have passed unnoticed. The two causes I refer to are:—1st, the presence of a trace of a salt of copper in the nitrate of silver bath, on which the paper is sensitised; and 2nd, the presence of chloride of sodium or some other soluble chloride which remains in the proof after it is finished. I think that the presence of these two bodies suffices to explain the numerous difficulties which photographers have experienced hitherto, and which have almost made them despair of arriving at a complete permanency. When a sheet of paper has been sensitised on a nitrate of silver bath, containing a notable quantity of a salt of copper, it is first found that the proof is slower than ordinary in printing, and, if the copper was in large proportion, that on removal from the printing frame it is dull and dead; by leaving it for some time in a humid atmosphere, it begins to fade, and loses its half-tones, and finally, on putting it in the hyposulphite, it almost entirely disappears. The destructive effect is not confined to this proof, but communicates itself also to the hyposulphite, which thus acquires the property of destroying other proofs, even those which do not contain copper.

"As to the chlorides they are still more redoubtable, since they are not only largely scattered throughout nature, but are found in most spring waters; besides, as they are colourless, they are not visible to the sight. I had never thought of this course of instability until it occurred to me in my process of printing with the phosphate of soda. I had printed several proofs by this process, and had fixed them with phosphoric acid according to the method previously described; but, having washed them in spring water, I dreaded the precipitation of salts (carbonate or chloride) or silver in the proof, and to assure myself that they were perfectly fixed, I passed them in a bath of ammonia, then dried and put them aside to tone them with gold. Having one day taken one of these proofs, I held it before the fire, and I saw the red tone it had at first gradually change to a sepia; on warming the other proofs they likewise changed. This change was not only remarkable from the fact, but still more by its intensity, and I flattered myself that I had found a method by means of which I could dispense with the toning bath. These proofs were sized the same evening, but, to my great surprise, I found on the following morning that they had almost entirely faded away. Believing that this effect was produced by impurities in the paper or the size, I sized others on paper of which I was sure, and with dextrine which I had often used on previous occasions, but always with the same result, and even on sizing a proof on a glass it faded in the same manner. A proof being cut up in several pieces, one part was well washed in distilled water, another in spring water, and a third placed in a damp atmosphere. Of these three, the two first on drying remained perfectly stable, but the third lost its vigour; and another piece, that I had placed in a damp place, began likewise to fade. It was, therefore, evident to me that the destructive agent could not exist in the washing water, nor in either of the other baths except the ammonia one. I had often used ammonia without meeting with a similar occurrence. I then examined the solution of ammonia, and, on evaporating a drop on a platinum plate, I obtained a residue which completely disappeared on continuing the application of heat. A more complete examination satisfied me that this residue was chloride of ammonium. A proof was then cut in two, one part washed in distilled water, and the other in water containing a very small quantity of chloride of ammonium. On drying these two pieces before the fire, the first retained its red tone, while the other toned to a sepia, and on exposing these to damp, the first did not change, while the other faded considerably. Experiments made with chlorides of sodium, potassium, and calcium were followed by the same results.

"From this it follows that the presence of chlorides in the positive proof is very dangerous; we ought, therefore, to take every care to avoid any trace of chloride in the last washing water. Nevertheless, the proofs toned in the gold colouring bath do not so easily part with their vigour under the influence of chlorides. Hence, we ought always to use a gold bath for colouring our proofs.

"In seeking to form a theory on this interesting subject, it is necessary to consider the following facts, in order to determine, as speedily as possible, the destruction of the proof by the presence of chlorides. It is necessary, in the first place, that it should contain only silver, then that it should be frequently exposed to hygrometical changes, by removing it from a damp to a dry place and *vice versâ*. The acids, or their vapours, appear also to assist the toning of proofs, and a great quantity of water, especially if it be alkaline, retards the action. Hence, it may be supposed that the chloride on drying attaches itself to the silver composing the proof, which is thus converted into sub-chloride of silver, with a liberation of alkali. This explains the change of colour on drying the proof before the fire. The proof is then exposed to humidity, and the alkali finding itself free becomes deliquescent, and at the same time absorbs the carbonic acid of the atmosphere: the liquid thus formed still dissolves, perhaps, carbonic acid in excess. Two affinities then begin to act. The sub-chloride of silver, tending to absorb chlorine, becomes chloride of silver, and on the other hand an alkaline chloride is formed by the affinity of the carbonic acid for the alkali. These two forces acting together determine the decomposition; on drying and again exposing the proof to humidity, the same reaction is repeated until the entire proof has vanished, the whole being converted into chloride of silver, or the chloride of sodium being exhausted. We see, at the same time, that the chloride of ammonium (since the ammonia is liberated and escapes as a gas) should produce this effect of toning more strongly than the other chlorides.

"As to the question of copper in the nitrate bath, I think that its destructive action may be attributed to a similar cause, in that the chloride of silver of the proof, by dissolving in the hyposulphite of soda, gives birth to chloride of sodium, and this, with nitrate of copper, gives nitrate of soda and chloride of copper, which chloride is very powerful in its destructive effect, and decomposes the silver of the image with formation of subchloride of silver, which afterwards decomposes and partly dissolves in the hyposulphite of soda in proportion as it forms. The alkaline chlorides are not the only ones to produce the reaction of which I have spoken above; the same effect is produced with several others, if not all the chlorides, such as, for example, those of copper, iron, mercury, cobalt, &c.; but these are not so much to be dreaded, for they are not often found in ordinary springs, and even when they do exist there, they are easy to be distinguished."

M. Girard made some observations on this paper. Relative to the first point mentioned by Mr. Lyte, he thought that if the presence of salts of copper in the nitrate of silver bath hastened the alteration of the proof, the cause ought not to be in the nature of the base, but in the neutral state of the salt of copper. It was known that the salts of copper always presented an acid reaction; and that from that circumstance they appear perfectly capable of producing the decomposition of the hyposulphite. He saw a proof of the reality of this hypothesis in the alteration that the presence of these salts led to in the hyposulphite bath.

As to the second point, it appeared difficult to explain it in the present state of photographic chemical knowledge. Therefore it seemed to him that new experiments should be made, and that Mr. Lyte was better qualified than any other person to carry them out satisfactorily.

The thanks of the Society were awarded to Mr. Lyte for his communication.

M. Davanne then made a communication on the subject of Mr. Young's experiments.

M. Bertoch made some observations on a new arrangement of the diaphragm, invented by M. Voigtlander, which he characterised as being of great value to photographers.

A paper on the subject of the stereoscope, by M. Claudet, was then read.

M. Humbert de Molard exhibited two models of a new kind of expanding camera, constructed by M. Relaudin, after designs by M. Davanne.

M. Vital Bonjut presented the Society with an apparatus he had invented, the object of which was to produce graduated grounds on positive proofs.—*Condensed from the Bulletin of the French Photographic Society.*

Meeting of the Manchester Photographic Society.

At the last meeting of this Society, Mr. Sidebotham, the Chairman, claimed for Mr. Dancer the merit of having been one of the first to practice micro-photography, he having taken some daguerreotype pictures of this kind so long ago as 1839. In the following year he publicly illustrated his method of proceeding at a lecture delivered at the Liverpool Mechanics' Institution; he also employed the solar microscope for taking photographs of sections of wood and fossils. From the impossibility of viewing micro-photographs on silver plates with a power exceeding twenty diameters, Mr. Dancer laid it aside until the discovery of collodion, when he resumed his experiments, and produced some wonderfully minute specimens, some of which were in his (the Chairman's) possession, and others had been forwarded to Her Majesty, while a considerable number were in the hands of opticians, both in this country and on the continent.

The members were enabled to judge of the minuteness of Mr. Dancer's specimens, several being placed on the table for that purpose; among others, a micro-photograph of two pages of a book, containing 3631 letters, covering only $\frac{1}{6000}$ of an inch.

Mr. Dorrington read a paper on printing glass transparencies, the joint production of himself and Mr. T. H. Nevill, by a process which Mr. Sidebotham characterised as a very good one, he having tried the plates, and found them more sensitive than collodio-albumen. Mr. Pattison showed some pictures taken by him with dry collodion on gelatine.

Mr. Parry mentioned that he had written, in faint letters, on the collodio-albumen plate with a blacklead pencil, and found that the letters developed very black and sharp.

Mr. Mabley called the attention of the meeting to a circumstance which he considered rather curious. He coated a prepared collodio-albumen plate with collodion, in order to take a picture by the wet process, and after exposing and developing, he found that the picture came out with great intensity. He afterwards removed the collodion from the albumen surface, coated it afresh, exposed, and developed it, and, rubbing it off again, found no traces of a picture in the collodio-albumen film.

North London Photographic Association.

The proceedings of the above Association at their last meeting were confined almost exclusively to the business of the Society. The annual report was read, which gave a favourable view of its financial position, and congratulated the members on the unanimity and good feeling that had existed among them during the past year.

The thanks of the Association were given to Mr. Moon on account of his past services. He retires from ill health.

The following gentlemen were re-elected:—C. Woodward, Esq., F.R.S., J.P., President; G. Shadbolt, Esq., Vice-President; H. W. Hill, Esq., Treasurer; J. Barnett, Esq., Honorary Secretary; after which the other officers were elected.

Mr. Hislop exhibited a lantern made from his design for illustrating lectures by means of transparent glass positives, &c., and read a description of it.

The business of the evening was closed by the thanks of the Association being voted to the officers for their services during the past year.

Liverpool Photographic Club.

The discussion at this meeting was opened by Mr. Forrest, who expressed his obligation to friends who had suggested the use of mercury for increasing the intensity of the photograph. He found that this metal induced a ready deposit of copper from the battery, but there was a difficulty in marking its half-tones more strongly, as well as in delineating delicate photographs. He tried to obviate these difficulties by surrounding the picture with copper wire, and was inclined to think that this would facilitate the deposition.

Mr. Leithead suggested that tin-foil would be a more ready conductor of the weak galvanic current.

Mr. Corey thought that a more ready susceptibility of the surface to receive the effects of the current was what was required, and not a more subtle means of inducing a current. The application of mercury facilitated the formation of the copper film, at the same time that it intensified the image. In electrotyping, certain portions of the object to be coated repelled the metal, and it was the practice to wash those portions with a solution of proto-nitrate of mercury, and he suggested its employment in a similar manner in the present case.

Mr. Dutton observed, that as grape sugar and essential oils reduced silver in its metallic form, they might be used to throw down copper upon the surface of the glass.

Mr. R. Cook suggested the application of phosphorus dissolved in bisulphuret of carbon, to facilitate the deposit of silver; but—

Mr. Keith did not see the use of a method which, by throwing a film over the whole surface of the plate, would obscure both lights and shadows.

Mr. Corey thought that Mr. Cook's idea might lead to the abandonment of the battery altogether. He had a negative, taken five years ago, when he and Mr. Berry were working together, which the latter gentleman, finding too weak, had, after it was varnished, washed with an alcoholic solution of chloride of gold, and then blackened with sulphide of ammonium. He was of opinion that this would give the intensity Mr. Forrest wanted, and would willingly lend him the negative—an offer Mr. Forrest accepted, and promised to report the result he obtained at the next meeting.

Mr. Doyle produced specimens of what he called chromatypic printing. It was based on Mr. Hunt's process, but differed from it in sundry respects. He did not, however, give the full details of the process.

The Rev. T. Banner described a contrivance of his for sensitising and developing stereoscopic plates in the open air; which consisted in arranging a shelf, at a certain distance down the camera legs, from which a covering of black velvet extended over the top. A glass eye-piece was fitted in it, as well as a glass window, the hands of the operator passing through sleeves surrounded with elastic at the wrist, in the ordinary way in such apparatus.

Miscellaneous.

◆

The "Drunk and Disorderly" Portrait Gallery.—We have recently heard that it has been suggested to more than one of the metropolitan magistrates, that instead of fining persons for being "drunk and disorderly" the small sum of five shillings, that it should be raised to ten shillings, devoting the extra five shillings as a salary to a photographer, who should be attached to the police office to take the portraits of the offenders, and that these copies should form the "Drunk and Disorderly" Portrait Gallery. We are unable to say whether this movement is prompted by a Maine Law Alliance man or not. Should the suggestion be carried out, it will be a rather awkward one, as it will be useless on the part of those who offend to give a wrong name to prevent exposure in the newspapers, when such a truthful description as a photographic portrait is taken.

Is the Planet Mars Inhabited?—The opponents of the doctrine of the plurality of worlds allow, that a greater probability exists of Mars being inhabited than in the case of any other planet. His diameter is 4,100 miles, and his surface exhibits spots of different hues—the seas, according to Sir John Herschel, being *green*, and the land *red*. "The variety in the spots," says this astronomer, "may arise from the planet not being destitute of atmosphere and cloud; and what adds greatly to the probability of this is, the appearance of brilliant white spots at its poles, which have been conjectured, with some probability, to be snow, as they disappear when they have been long exposed to the sun, and are greatest when emerging from the long night of their polar winter—the snow-line then extending to about six degrees from the pole." "The length of the day," says Sir David Brewster, "is almost exactly twenty-four hours—the same as that of the earth. Continents, and oceans, and green savannahs have been observed upon Mars, and the snow of his polar regions has been seen to disappear with the heat of summer." We actually see the clouds floating in the atmosphere of Mars, and there is the appearance of land and water on his disc. In a sketch of this planet, as seen in the pure atmosphere of Calcutta, by Mr. Grant, it appears, to use his own words, "actually as a little world," and as the earth would appear at a distance, with its seas and continents of different shades. As the diameter of Mars is only about one half of that of our earth, the weight of bodies will be about one half of what it would be if they were placed upon our globe.—*Curiosities of Science.*

Photographic Notes and Queries.

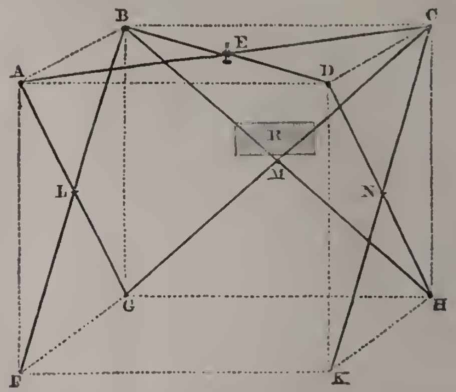
◆

HINTS ON POSITIVE PRINTING.

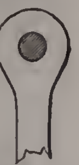
Dear Sir,—It has often occurred to me that a hint might be borrowed from the process of calico printing which would be applicable to photographic printing. If a "mordant" could be fixed in the pores of the paper by the action of light, and, after insolation under a negative, that portion of the mordant not acted upon washed out, and the paper then passed through a colouring bath, and the colour extracted from the unmordanted portions, we should get a positive print which I conceive would be permanent. One mordant alone would suffice—the acetate of iron—to give various shades of colour, in a bath of madder, from black to violet, according to the strength of the mordant. The objection would be, I imagine, that the paper would hardly bear the repeated washings; but there is a fabric called, I believe, satin jean, on which may be traced the finest lines with a pen and marking ink; now this fabric would bear boiling and bleaching. The processes of carbon printing are, in fact, the fixing by light of a kind of mordant, which renders the vehicle for the colouring matter insoluble in water. I have no time to experiment on the subject; but your intimate knowledge of chemistry will enable you to judge at once if the process I suggest would be at all feasible. In all probability, the same thing has occurred to you long since. Thomas Barrett.

IMPROVED PORTABLE TENT.

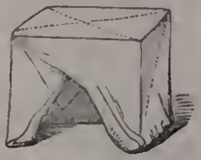
Sir,—Like your valued correspondent "H. S. I.," I have tried not a few tents and developing boxes. As the subject of portability is one of such importance to lovers of the picturesque, I have taken the liberty of sending you a description of a tent I have constructed, and found very useful, and extremely portable.



A G, B F, are two iron rods about the thickness of a stair-rod, and 4 feet 6 inches long, they are riveted together at L so as to form a cross. BH, CG, CK, DH form two similar crosses; these three crosses are bound firmly together at B, C, G, H, with well waxed whipcord; the tops of the rods AG, BF, CK, DH are flattened, and made into a loop thus—



AE, BE, CE, DE are somewhat thinner, and looped at both ends; the rods at A, B, C, D are thus looped together, the loops acting as an universal hinge. A screw passes through the other ends of these rods at E, and they are fastened tightly by means of a nut. The covering is sewn strongly to the framework at A, B, C, D. I have found it an advantage to sew a small piece of leather at each corner of contact with the framework. Entrance is gained by means of a double curtain, thus—



Suppose the view taken, and the tent to be removed; unscrew the nut at E, the four rods forming the top then fall into the angles of the tent, and the whole will close up together by means of the pivots at L, M, N; the covering naturally falls round it like an umbrella cover. It is as well to have the cover about 6 inches longer than the framework, to allow it to lap over on the ground. The light I use is a piece of yellow calico, covered on both sides with oil-skin, about the size of a stereo-plate, let in at the back (as R).

My stereo bath I suspend from the angle at M, my developers in a little pouch at N, and my plate box (12 plates) at L. I may observe that I pack all my apparatus for taking a dozen stereoscopic pictures inside my camera, which has a leathern handle at top, and acts as a box. I take my tent and legs in one hand, and the camera in the other, strap my water bottle (India rubber) on my back, and feel moderately independent.

Allow me to take this opportunity of thanking you for your admirable "Lessons on Colouring," which have been of much service to me. F. R. E.

QUERIES ON DRY PROCESSES.

Sir,—I have been working the collodio-albumen process, as described by Mr. Sidebotham in a previous number of your paper.

Up to the fixing or last washing all goes on well; but in one or other of these last processes almost invariably the film cracks in every direction, entirely spoiling the picture. The cracks are hardly of the nature of blisters. Can you suggest the cause, and what is of more importance to me, a preventative to any recurrence of these.

I have taken every possible precaution in drying the plates thoroughly by heat, both before collodionising, after albumenising, and before sensitising for the second time.

I have also allowed the collodion to set at least one minute before sensitising. I have been using the alcoholic collodion advertised for dry processes.

It seems strange that not the slightest indication of cracks or blisters should appear until the final step has been taken; it certainly is annoying to see a picture develop perfectly and then ruined.

I have now about 40 plates ready for the second sensitising, but I dare not finish them until I know whether it be possible to preserve them from the fate of their predecessors.

I find the plates not nearly so sensitive as stated by the Manchester Committee—frequently requiring four or five minutes' exposure.

Do you consider the metagelatine process a certain one? I have seen such excellent pictures taken by it, that if its certainty were equal to that of collodio-albumen, I should much prefer it. Are blisters and cracks as frequent in it as in the collodio-albumen? Whence arises the uncertainty in any of these preservative processes—say the metagelatine? Is it due to the *collodion, bath, or manipulation?* Mr. Cleaver tells us that he has taken 15 good pictures in one day with 15 plates, and 17 next day out of 18. I have seen some of these, and they are the finest specimens that ever it was my lot to witness.

If he can do this with certainty almost absolute, how is it that another out of 18 plates will have 17 failures, although following his instructions with the greatest exactness? PHOTOS.

[The points touched upon in our correspondent's letter seem to us of such importance, that we think it better to publish his queries in full, and ask for information from those who may have specially considered the process, than to give him an answer in our "Answers to Correspondents."—ED.]

APPARATUS FOR WASHING POSITIVES.

SIR,—I have lately had in use a simple and inexpensive apparatus for washing positive prints, and find it to answer the purpose admirably; it consists of a deal box eighteen inches square by five inches deep, with rests two inches from the top to support a board perforated with small holes. The bottom is made of very coarse linen, and the whole mounted on four legs three inches high. The prints are placed on the linen bottom, and the perforated board on the rests, when it may be put into the sink and the water turned on it. I generally contrive to put my prints there in the evenings, so that it may be at work all night without the interference of any inquisitive persons. I think parties who (like myself) dabble in photography, and have found the inconvenience of not having a running stream near at hand, will find this a first-rate substitute.

My thanks are due to your valuable correspondent at vol. i. p. 86, for his description of positive printing; since using that method, I have not had one spoiled print, except through carelessness, which I, in future, intend to avoid.

W. HAYES.

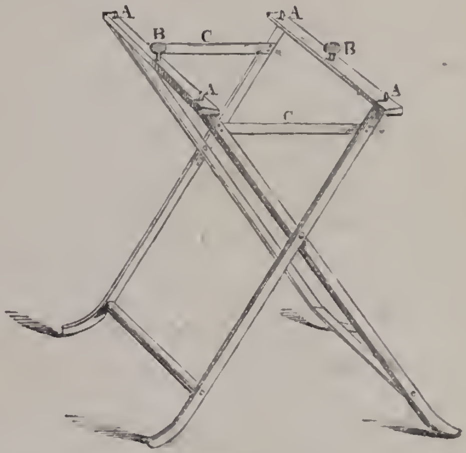
ACETIC ACID IN THE NITRATE BATH FOR POSITIVE PRINTING.

SIR,—Permit me to add the testimony of my experience to that of your correspondent "θ" in a recent number of the "PHOTOGRAPHIC NEWS," that acetic acid, added to the nitrate of silver bath for positive printing, *does not produce spots*, or any other kind of discolouration. During the last eighteen months I have sent out many thousands of prints, which, for the purity of the whites, and freedom from discolourations of any description, cannot be surpassed, and my silver solution has almost invariably been acidified with acetic acid. If spots appear let the operator seek elsewhere for the cause, for certainly the fault lies not in the acid. Purity and suitability of chemicals are, doubtless, of great importance—so, also, is intelligent care in their use—and if some of our brother photographers would learn to question their own capabilities, it is just possible they might find out that most of their mishaps and failures arise from their own careless manipulation, rather than from any fault in the chemicals employed. THOMAS J. BARNES.

PORTABLE STAND FOR A DEVELOPING BOX.

SIR,—In vol. ii. p. 23, a correspondent, "P. F. P.," inquires about a strong stand for a developing box.

I have tried several, but found all vibrate too much to work with comfortably; and having made a light stand (though not so portable as to pack up in the box), I beg to forward a sketch of the same, hoping it may be of service to "P. F. P." and others.



Uprights of beech, $1 \times \frac{3}{4}$ inch × 3 feet 4 inches. Cross rails at top, $1\frac{1}{4} \times 1$ inch, thinner on one edge. Cross rails at bottom, $\frac{1}{2} \times \frac{3}{4}$ inch. C C two pieces of webbing. A A A A four studs to fit into bottom of box. B B, two thumb screws to pass through bottom of box into stand, which has brass plates to receive them. Width of stand at top, 9 inches; at bottom, 15 inches.

When folded, it can receive the folding camera and tripod laid in between. It may be carried in a bag to fit.

M. D.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

SIR,—One of your correspondents H. T. (M.R.C.S.), is annoyed at his white varnish destroying his collodion pictures. One of the causes is the presence of ether; and another, the alcohol being too strong. The remedy is—to dilute the varnish with ordinary spirits of wine.

J. I. MAGINN.

THE RASPBERRY SYRUP PROCESS.

SIR,—Would "M. P. M." kindly do me, and many others, a great kindness, in stating how he made the raspberry syrup process answer? I have tried several times, but in vain; nothing ever appeared on development. J. C. S.

ANSWERS TO MINOR QUERIES.

ADHERENCE OF THE VARNISHED NEGATIVE TO THE POSITIVE PAPER.—*W. S.* has left two valuable negatives out of doors printing, and on unscrewing the frames he found the paper so closely adhering to the negatives that they would not part without detaching the varnish. The varnish was of a good French make, and the paper was quite dry. As a preventative, we advise that the negatives, after being varnished, be exposed to the full sun, or kept in front of a fire, protected from dust, and at a temperature of about 120 degrees for a few hours; when quite cool, the varnish will be found to be hard. If any of our correspondents are unfortunate enough to have such a thing happen, they must never attempt to separate the paper and negative by pulling; that is the worst thing they can do, and the destruction of the picture will be the almost certain result; the best thing will be to immerse the negative and paper in hot water, and in a few hours the paper will be sufficiently softened to be removed without difficulty; if, however, it still adheres, remove it from the dish, and having placed it on a levelling stand, pour over it a solution of oxide of cuprammonium as described in a recent number, and in a few minutes the paper will be dissolved, and the surface of the negative may be cleaned by gentle friction; wash it well and dry.

Hanging up Prepared Paper.—*A. Been* has found great inconvenience in the talbotype process, owing to the iodised paper, after long soaking, becoming too tender to admit of its being hung up by pins or clips at the corner in the usual way. The best plan for our correspondent to adopt will be to dry the sheets between blotting paper, and then, having fastened two strings across the room about 3 inches apart, place a sheet of clean blotting paper over these, and on this the iodised paper: this plan is preferable to hanging it direct over the string, as the latter is liable to produce a mark.

Preparation of Calotype Paper in Large Quantities.—*D. A. Smith.* Perhaps the following plan, which has been for some time past in use amongst the calotypists of America, will be of service to you:—Provide a piece of deal board of the width of the paper to be prepared and six or eight feet in length. Pin the paper to this board with silver pins to its entire length, letting the edge of each piece underlap the foregoing one about the eighth of an inch. Place the board in an inclined position, and with a flat, soft, broad brush, lay on the first solution of nitrate of silver, beginning at the top and proceeding carefully and lightly downwards, taking all precaution that the entire surface of the paper be evenly and thoroughly wetted. Now incline the board with its edge downwards, that the superfluous moisture may run off and leave the paper to drain and dry. As soon as it is quite dry lay on the solution of iodide of potassium in the same manner; when the paper is again half dry it must be taken from the board and dipped into or floated on water, taking care that no air bubbles intervene between the prepared side of the paper and the water. After soaking for the requisite time the sheets must be fastened with a pin by one corner to some projecting shelf, suffered to dry, and then put away for use. The whole of this process must be conducted in a *dark*, *cool* room. Neither in this nor in any subsequent part of the proceeding should the paper be touched either by wiping or with blotting paper, for such would disturb the surface and leave marks which will be sure to appear subsequently.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Thermography.—Articles on *Radiant Heat*, by M. Melloni, are to be found in Taylor's "Scientific Memoirs," part 1, pp. 1. 39, part 2, p. 235, part 3, pp. 383, 388; and an article on the *Polarisation of Heat*, by the same author, in "Scientific Memoirs," part 6, p. 141.

Anxious Inquirer.—1. We do not think that the fault originally lay in the bath at all, but, rather, in the collodion or developing solution. Now, however, the alternate doses of ammonia and acid to which you have been treating it, are sufficient to injure a bath of the strongest constitution. You should never add ammonia to a bath; but if it requires to be neutralised, do it with solution of pure carbonate of soda. In the present instance, if you get no better results on changing the developing solution or collodion, try the effect of *sunning* the nitrate bath, and if that proves ineffectual, make a fresh one. 2. See vol. i. p. 24. 3. It should be cleansed by a professional photographer, as it is an operation requiring great skill and experience.

W. H.—We have never had an opportunity of trying the lenses you name.

H. Patey.—Strain it *well*, and it will not be of much consequence if a little of the germ has got into the albumen.

H. A. W.—Your collodion residues contain too little ether; and, possibly, water has been absorbed from the atmosphere. Add a mixture of 6 parts pure ether and 1 of absolute alcohol, in small quantities at a time, trying the effect at each fresh addition by taking a picture. In this way you will, most likely, avoid the parallel transparent lines.

A Constant Subscriber.—It shall be attended to.

W. B. H.—Your stereogram is a very good one. We will insert your name in the next list.

F. C.—See "collodio-albumen process" in the index of our first volume.

R. L D.—1. See Mr. Heisch's corrections at vol. ii. p. 20. 2. Meta-gelatine is gelatine which has had its power of gelatinising in an aqueous solution destroyed by heating with an acid. 3. Gelatine should be used in preference to isinglass. 4. The focal point is that at which the image of the sun thrown on the sheet of paper by the lens, appears *smallest* and has the edges most sharply defined.

An Amateur.—The pinholes in the black parts of your negatives may arise from your collodion being prepared with an alkaline iodide and not having properly settled, or from the bath requiring filtering.

C. Barker.—Our correspondent has already given a detailed description of his method of working the Fothergill process, in an early number of the "News." See our first volume. 2. We will give full particulars in an early number. 3. Yes; but better methods have been already described in our first volume.

B. and W.—Received.

Diggle.—1. Pouring the developing solution too much on one part of the plate is the most likely cause for the transparent patch which you describe. 2. We do not recommend it on our own authority. 3. We are very well pleased with the working of the lenses you name; more than this we cannot say 4 and 5. Send an addressed and stamped envelope, and we will give what information we can.

W. A. Thompson.—The negative from which your picture was printed is a very fair specimen of the process. The printing also is very good, but would have been better if it had been a little warmer in tone. It would be as likely to be as permanent as any similar process.

G. N. D.—We are much obliged for your interesting communications. Your pictures are equal to the average, but might still be a little improved. They would mostly have borne longer exposure, and we also think that the printing process hardly renders them with sufficient vigour.

X. Y. Z.—Received.

Muddle.—We can only suggest that the bath is too acid; remedy it by adding carbonate of soda, in sufficient quantity to make it *quite* neutral.

Beta.—See opposite.

E. J.—1 You can easily find what you want by referring to the index of our first volume. 2. Fifty grains to the ounce will be preferable to adopt when no particular strength is mentioned.

W. L. M.—Liver of sulphur can be purchased at the druggists. Your crucible was not heated sufficiently; powder the fused mass, mix it with its own bulk of dry carbonate of soda, and heat in a crucible to whiteness again, keeping up the heat for an hour.

C. G.—The substance of your communication would appear best in your proposed advertisement.

A Subscriber.—1. It will be impossible for us to suggest a more probable cause of fading than imperfect washing, unless we knew the whole particulars of the method by which the picture was printed. 2. We cannot answer for the efficiency of all the articles advertised in our columns. We prefer Taupenot's process. 3. An expanding camera.

A. Nelson.—Received.

W. S.—1. Answered above. 2. Wash twice for about half a minute, taking for a stereoscopic sized plate about ½ an ounce of water. Your picture would have been improved had the exposure been longer; it is rather *hard* 3. Allow more time to elapse between coating the plate and immersing it in the bath; this will remedy the greasiness you complain of.

Aliquis.—Maxwell Lyte's is a very good toning bath; so is our correspondent O's. Your cautions are very good; and we shall have much pleasure in presenting them to the photographic public.

W. R. R.—Consult the index to vol. i.

Nit. Sil.—You added carbonate of soda in too great a quantity, and thus you not only neutralised the acid, but precipitated carbonate of silver. This you should have filtered off, and then added a drop of glacial acetic acid to the clear solution.

* *—See answer to W. R. R.

G. H.—Rinse your bath out first with alcohol, then with cyanide of potassium, and, lastly, with one part of strong nitric acid and three of water; afterwards well wash, and it will be fit for use.

J. G. D.—Our correspondent should have mentioned the subject before. As it is, the credit of first publication is decidedly due to Mr. Rump. However, we cannot believe a true photographer is actuated by any other motives than a desire to benefit his fellow-labourers in the art, and we will therefore gladly give "J. G. D." an opportunity of communicating his experience with saccharo sulphate of iron as a developing agent, if he will favour us with particulars.

M. Henry.—1. Your toning bath is evidently at fault; either the chloride of gold is impure, or the formula not good; try Maxwell Lyte's, or the one recommended by O in a recent number. 2. We do not observe the stain you mention. 3. Your description is that of a good negative rather over developed.

Amateur.—1. The collodio-albumen process. 2. Aplanatic.

W. G. G.—The price is 1s. per part. We do not know the publisher, but you can get it through any bookseller.

Colon.—1. We will consider about it. 2. The reason is not very exactly known. 3. Coating a camera with white inside instead of black is attended with very great disadvantages, and we therefore cannot advise its adoption. Foggy pictures would be the certain consequences. 4. Yes; if the lids be made tight.

Henry N.—We do not think that a collodion made with good methylated ether and alcohol would be likely to injure the bath.

Enquirer v. Despair.—1. Had you rested satisfied with the first mess you had got into, we could have helped you; the nitric acid which you spilt into the bath might have been neutralised with oxide of silver, and the bath made fit for use again. But, instead of applying at once to us for advice, you did the very worst thing in your power—added a quantity of ammonia. Your bath is now so charged with nitrate of ammonia, that nothing can be done with it. Make a fresh bath, and in future treat it with more respect. A child can easily damage the constitution of a bath in such a manner that it would puzzle twenty clever chemists to set it right again. 2. Your second failure may be remedied by using a faintly acid bath.

Communications declined with thanks:—O. U. R.—Lord F.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Pyro. G.—Cut.—Parliament.—G. P. R.—Silentia.—Photo.—An Amateur.—W. C.—L. A. M.

In Type:—Zeuxis.—A Kerry Man.—Beta.—W. L.—R. P. H. N.—Aliquis.—J. I. Maginn.—G. W.—T. Barrett.—J. B. Cooke.

☞ A Reading Cover has been prepared for preserving the numbers until bound, which may be had of the publishers, price 2s.; post free, 2s. 2d.

⁂ Subscribers can have the numbers of the first volume strongly bound in cloth, lettered, for 2s. if sent to the office; or, if accompanied by a cloth case, the charge for binding will be 6d.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 34.—*April* 29, 1859.

PHOTOGRAPHS IN THE DARK.

THE EFFECT OF HEAT IN THE FORMATION OF CERTAIN PHOTOGRAPHIC IMAGES.

On the 4th of March last we described some experiments which we had recently been making on M. Nièpce de St. Victor's "New Action of Light," and in our article (vol. i., p. 301) we gave it as our opinion, deduced from careful experiments, that radiant heat was capable of producing similar photographic effects to those which M. Nièpce obtained by means of his "stored-up" light. These opinions were further strengthened by experiments, which were described at p. 12 of our second volume. We now read that on the 7th of March last, M. Gaultier de Claubry deposited a sealed packet in the keeping of the French *Académie des Sciences*, which, being opened at the last meeting of that learned assembly, was found to contain a note, from which we extract the following:—

"The remarkable facts observed by M. Nièpce de St. Victor relative to the action of light have proved that this can, so to speak, store itself up in bodies, which are submitted, for a greater or less space of time, to its influence. Amongst them are some which demonstrate that this action is augmented by that of heat; but it does not follow from any of them that *heat alone* is capable of producing effects analogous to those of light. Gay Lussac and Thenard have shown, in their physico-chemical researches, that heat acts on certain organic substances in the same way as light. Guided by these researches, I have been led to make comparative experiments on the influence of light and heat in reproducing characters on sensitive papers, and I have obtained results which seem to me to promise success. Papers rendered sensitive by means of aceto-nitrate of silver, nitrate of uranium, or gelatine mixed with bichromate of potassa, and placed for a length of time, varying from twelve minutes to an hour, on a sheet of paper covered with printed characters, and heated to 100 to 120 degrees (212° to 248° Fahr.), furnished a complete reproduction in the case of the black ink, but one hardly sensible with red ink; a result analogous to that which M. Nièpce de St. Victor has observed in the action of light. Although incomplete, the facts which I announce seem likely to be of future interest, and I, therefore, deposit them here in order to secure the priority of publication (*dans le but de prendre date*)."

We are not afflicted with over-sensitiveness respecting any real or fancied appropriation of our own ideas by others, or we should frequently have occasion to break a lance with some of our contemporaries, and we are willing to admit that the three days' start which we have over M. G. de Claubry is the result of pure accident, and that he deserves the full credit for any originality which there may be in the discovery. Our object is to draw the attention of our readers to the importance of making known to the world, as soon as possible, their discoveries or improvements. We are daily receiving letters from persons who, having seen in our columns a description of some apparatus or improvement which they have previously found out, claim for themselves the priority of invention, forgetting that this is universally held to be decided by priority of publication. When we see our continental brethren so jealous of their fame as actually to take such steps as the above in order to secure, to so trifling a discovery, the earliest possible date, our correspondents should be similarly watchful over the fruits of their own brains, and remember that the best way to secure the credit of any discovery is to publish the account of it before any one else; not to wait till another has benefited the world by a full publication, and then to come forward stating that the same idea had previously existed in their own minds.

PHOTOGRAPHY IN THE WITNESS BOX.

The application of photography to legal purposes is ever presenting some novelty, and certainly we may rank this as one of the wonders of the age. No reader of the law reports which abound in our daily papers, can avoid being cognisant of the immense amount of "hard swearing" which too often disfigures judicial inquiries and investigations. There can be no doubt but that in many instances we may find witnesses of the opposing sides who conscientiously narrate their own version of a transaction, and yet often differ diametrically in their tales. These discrepancies frequently arise from imperfect knowledge, or want of proper observation. It may often happen that a person is accidentally the witness of some affair which ultimately becomes the subject of a legal suit, and may feel no particular interest in it beyond a momentary inquiry, and as a matter of course cares little about the correct particulars relating to it. In time he is subpœnaed as a witness, and is subjected to a severe cross-examination, and owing to his want of proper attention at the time of the transaction he may be caught tripping and actually make admissions which he did not intend, or which are directly the opposite of the real facts. Under all the possible disadvantages of human witnesses, there can be no doubt but that it is highly desirable, whenever it is possible, to call into requisition the most truthful witness in the universe—photography; because, whatever may be the wish of an *ex parte* photographer to take photographs of things that will favour the side for which he is engaged, it is impossible for him to tamper with the mechanical witness of which he has every control except that of making it speak falsely. The most recent application of photography to legal purposes was in the notorious case of Hughes *v.* Dinorben. This was a case brought by a Mr. Hughes against Lady Dinorben for writing scandalous anonymous letters, which tended much to his injury. In the court many of the letters were produced, but to prevent the possibility of losing them, Mr. Hughes had negatives taken of each, and then he was enabled to put into each juryman's hand a fac-simile of these precious compositions. Of course there could be no objection to the reception of these copies as evidence, because they were too self-evident. By comparing the writing with some of Lady Dinorben's acknowledged writing, the jury arrived at the unanimous conclusion that she was the writer, and accordingly gave a verdict for the plaintiff. But in another case we have a still more important illustration of photography in the witness box, to which we alluded in a former number. Very recently there happened to be a "slip," as it is technically termed, of some land, in connection with some public works. Of course the parties who had engaged the services of the civil engineers and contractors blamed them for insufficient work. As the case was one of importance and involved several thousands of pounds damage, the proprietors at once sent for an able photographer, and he, under the direction of another civil engineer, who was called upon to give his advice in the emergency, took a series of views from all parts, and in a manner to satisfy the most particular jury that ever was assembled. It will at once be seen that this was a most important step, because the proprietors were enabled to proceed at once with remedying the misfortune. Had they not availed themselves of photography they must have left the embankment in a dangerous state, hourly becoming worse, in order that a "jury of inspection" might be called upon to view and arbitrate on the matter. Besides this, another and striking advantage accrued: good and correct photographs prevented the possibility of the "hard swearing" above alluded to. Because we may rest assured that in giving evidence the witnesses for the plaintiffs would be inclined to exaggerate the damage, while, on the other hand, the witnesses for the defendants would naturally depreciate its importance; but photography happily comes in between the two and sets both sides right by giving truthful and correct information. May we not hope that the day will soon arrive when photography, wherever it can be used, will be made available for the purpose of promoting justice and equity between man and man While on this subject we may allude to another and most important application of photography. It is perhaps not, strictly speaking, a legal application of photography, though in some instances it may be so termed. We allude to a suggestion made at the annual meeting of the "Association for the Prevention of Beilers Bursting." This association originated in Manchester some time ago, owing to the great number of lives that were annually lost by the bursting of boilers in large manufactories. The association appoints several agents to inspect boilers, and to report on imperfect ones, so that they may at once be remedied. There can be no doubt but that this association has already saved several hundreds of lives, and it is to be hoped that similar associations will be formed in all the large towns, so as to prevent the great annual sacrifice of life which takes place simply for want of proper care and attention. One of the members of the association has suggested that in future, when any of these unfortunate accidents occur, there should be photographs taken of the boilers that have burst in order that a museum of such photographs might be formed, with reports showing the cause of bursting. This suggestion, we are happy to learn, has been adopted, and in future photographic copies of all these accidents will be taken, as guides and warnings to others to keep clear of what had produced the fatal result.

CELESTIAL PHOTOGRAPHY.

IT will be remembered that in our 29th number (vol. ii., p. 25) we gave an interesting extract from the report of the council of the Astronomical Society, in which a *resumé* was given of the progress which had been made in the application of photography to the reproduction of celestial objects. Our learned foreign contemporary "*Cosmos*" has given the above-mentioned extract in the last number, and has added the following remarks:—The council of the Astronomical Society of London must excuse our casting on them some slight reproach. They have omitted all mention of the photographs of the eclipse of the 15th March, 1858, which M. Porro obtained with his object glass of 52 centimètres (nearly 20½ inches) diameter. These photographs would, on the contrary, have deserved serious attention in consequence of their size and sharpness, so well appreciated by M. Faye. The solar spots shown on them will bear a considerable magnifying power; in fact, their forms and dimensions admit of being very well determined and measured. The future of stellar photography lies entirely in the employment of object glasses sufficiently large to give negatives of such a size that, to obtain positives from them, any magnifying process will be unnecessary: images artificially enlarged must necessarily be less sharp; and what we ought to aspire to should be the reverse: negatives of very large area and reduced positives.

Let us hope that the talented director of the Imperial Observatory of Paris, following the steps of his illustrious friend, M. Otto Struve, and of Mr. Bond, will transform into an astro-photographic apparatus the large equatorial of 38 centimètres (15 inches) diameter, which M. Brunner has nearly erected in the large cupola of the observatory. We shall be anxious to know if the partial devitrification of the magnificent object glass of M. Lerebours has been entirely corrected and ground out—if it will again show on the surface of the moon those mysterious and unknown peculiarities which so perplexed and delighted François Arago—if, in a word, this important enterprise, continued for so many years, will be crowned with such a brilliant success that the skilful and enterprising artist may obtain at last the honourable recompense which has been promised him. Of all the members of the *Bureau des Longitudes* he alone remains undecorated.

We have also learned that M. Leon Foucault has recently put, at the Imperial Observatory, the finishing touches to the silvered glass telescope of 35 centimètres (about 14 inches) diameter, which will render good service to physical astronomy, and the more so since M. Leon Foucault is perfectly well acquainted with the resources and secrets of photography.

THE PSEUDOSCOPE.

THE pseudoscope is an instrument by means of which the influence of the mind over the eye, may be to a certain extent proved. This instrument is the invention of Professor Wheatstone, and consists of two reflecting prisms fixed in a frame, so arranged that in looking at an object, either eye receives a transposed image of that object through the corresponding prism, the effect of which is that the relief of the object is *converted*, in other words, has an appearance the very opposite of that which it presents when looked at with the naked eye. Thus, an intaglio assumes the appearance of an object in relief, and a medallion assumes a hollow appearance under the same circumstances. It was observed and recorded by Aguilonius in his *Opticorum Sex Libri*, published in 1613, that at a considerable distance all objects, whether convex or concave, appear plane; and he then goes on to show that when seen at a less distance the convex surface sometimes appears concave, and the concave surface convex, that is, they are converted. He very justly attributes this to the fact that the mind is imposed upon, through not perceiving the direction from which the light falls upon it. Subsequently to this, in or about 1744, Dr. Gmelin published a paper in the *Philosophical Transactions* on the conversion of a hollow seal into a raised one. To exhibit this phenomenon more perfectly an instrument was constructed, termed a cameoscope, some of which were single and others double. The single cameoscope was formed of two achromatic lenses of short focus, placed at nearly the sum of their focal distances apart; and convex bodies, when looked at through this instrument, will appear concave, and concave bodies will appear convex; it will, likewise, affect the apparent distance of the objects from the eye. The instrument of Professor Wheatstone has, however, many advantages over this; and is essentially a different instrument, though the effects produced by it are in some respects similar; and we differ entirely in opinion with a writer in the *North British Review*, who says of the pseudoscope, "that it is a most capricious and unsatisfactory instrument, which often fails to show what it ought to show," and that "it differed in nothing from the cameoscope, excepting that the inversion of the objects and their double pictures are produced by two reflecting prisms, in place of lenses." What the writer may mean by saying that it fails to show what it ought to show, is not quite clear. If his meaning is that *all* objects when regarded through it are not converted, and, *therefore*, that it is a capricious and unsatisfactory instrument, it must be admitted that it is so in that sense. *All* objects are not converted by it, but the exceptions are very few, and form an exceedingly interesting subject for consideration. As a rule, those objects which we have never seen otherwise than in relief, as the human face for example, obstinately refuse to be converted. If we view a hollow mask we shall see it in relief without any difficulty, and this may be readily effected without the instrument, by closing one eye and looking at it fixedly with the other; but if we try to produce the opposite effect, that is, to make the outside of the mask appear hollow, we shall find it exceedingly difficult, but it is not impossible with the aid of the pseudoscope; but neither with the instrument, nor without it, can the same effect be produced with respect to the human face, except on very rare occasions. Now, after what we have stated with respect to the mask, it will be evident that there is nothing in the formation of the features to prevent the same conversion; still the mind, which is conscious that the mask has two sides, one hollow and the other in relief, and, therefore, suffers the eye to be deceived, will not suffer the eye to be deceived with respect to the human face; it cannot admit the possibility of flesh and blood undergoing such a change.

To demonstrate the inability of monocular vision to give a true idea of a solid form, Professor Wheatstone stated in one of his memoirs that if we hold a small cube made of wire or ebony-beading, and look at it with one eye closed, while changing its position by turning it between the fingers, its various perspective projections are interpreted by the mind, so long as it retains the idea of the cube, as so many different representations of the same object. But as some of these perspective projections might be given by a very differentlyshaped object, it may happen that one of these dissimilar figures may suggest itself to the mind, and if the idea be fixed there by looking steadily at the object for a short time, it will be very difficult to bring back the original idea so long as the position of the object remains the same. But, if the movement of the cube between the fingers be resumed while the mind is still possessed with the false idea, the series of perspective projections then presented being irreconcileable with the converse form, the mind either goes back to the original conception of the cube, or, otherwise, the skeleton figure appears to undergo a continual change of shape.

Everybody is familiar with the effects of looking at a photograph with one eye; the figures represented assume greater vigour, and even, in some cases, appear in relief. To illustrate the ease with which the single eye may be influenced by the mind, we may mention that we had placed in our hands, a paper, belonging to Mr. Malone, covered with representations of coins engraved by Fizeau's process (described at vol. i. p. 75 of this journal). These were exceedingly beautiful, and it occurred to us to hold them in such positions that, when viewed with one eye alone, they alternately assumed the appearance of a cameo and an intaglio, according to the direction from which the light was supposed by the mind to fall upon them. Other effects are produced by looking at the photograph with one eye alone beside that of relief; on this point we quote a paragraph from a recent number of the *Edinburgh Review*; it says:—"We have noticed this, especially with regard to the representation of still water, which is generally one of the most unsatisfactory parts of a photograph, for although, when looked at with both eyes, its surface appears opaque like white whey, a wonderful depth and transparency are often given to it by viewing it with only one. There exists a photograph of a part of the sands and rocks at Tenby, in which not only the rugged projections and cavernous recesses of the former, but the smooth surface and the gentle undulations of the latter, become most vivid to the single eye; whilst a small patch upon the sand, the meaning of which is not otherwise very apparent, then shows itself to be a most faithful portrait of a little pool of water lying in a hollow of the sand, and reflecting the rocks above. The superiority of monocular to binocular vision here depends, not only upon the freedom under which the mind is left to interpret the picture after its own fashion, when no longer forced to view it as a flat surface, but also upon the circumstance that the photograph taken by a single camera is really a portrait of the object as seen by one eye; and, that whilst it is the truest possible picture when viewed under the like aspect, it is not a true picture as viewed by both eyes, since not merely the apparent shape of all near objects, but the character of their services as recognised by the mode in which light is reflected from them, is sensibly different, according as either eye is used singly, or both eyes together."

A very curious effect is produced by reversing the positions of two stereoscopic pictures, placing the right hand picture to the left, and the left hand picture to the right, and then looking at them in the stereoscope. When the picture contains statues, trees, or other objects, their relative distances will be changed,—the more distant becoming near, and the nearer retreating into the background; for example, a statue, standing between or in front of a row of pillars, will appear to be at some distance behind them; and in the case of groups of statuary, the figures in the background will appear to be in front of those in the foreground, while they are shorn of those parts which are concealed in the picture by the figures actually before them. In the cases we have mentioned, the change is simply one of distance, the figures retaining the appearance of relief.

The same appearance is not presented to every individual; to some they appear confused; and the same may be said of some pictures which, when viewed in this way, cannot be made to give a satisfactory idea of the solid form.

On first looking with the pseudoscope at the inside of a basin, the eye very frequently sees it to be hollow; the mind, being so much more familiar with the interior of the basin than with its external aspect, assumes it to be hollow, and the eye sees it in accordance with this idea; but after looking at it for a time, it changes its appearance, to some persons gradually, to others suddenly, and the image is converted. Sometimes, after this is effected, the real aspect returns to the mind, but is soon banished, and the new idea takes entire possession for a time.

There is a curious optical illusion which can be produced without the aid of an instrument. The cane bottom of a chair being placed in a vertical position before the eye, and the hands being placed upon it, will, if the optic axes be directed to a point beyond the chair, become invisible; and instead of the actual bottom being visible, a phantom of it will be seen suspended in the air between the eyes and the actual object, which, together with the hands, will become invisible; so that, to use the words of an eminent writer, the observer "*feels what he does not see, and sees what he does not feel.*"

PRESERVED LIGHT.

In our last number we reproduced an article containing a summary of the objections of the "Photographic News" to the recent experiments of M. Nièpce de St. Victor on the Action of Preserved Light. He has since made some fresh experiments, and embodied them in a note presented to the Académie des Sciences, in which he refutes these objections, and which we hasten to publish. This note is as follows:—

"I will reply by a single experiment to the objections which have been raised relative to the persistent activity communicated by the light to an insolated body.

"I placed in an icehouse a tinned tube containing a piece of cardboard impregnated with tartaric acid. After exposure for a sufficient time to the action of the light, this tube was buried in ice for 48 hours. A piece of sensitised paper, prepared merely with nitrate of silver, was placed beneath a thin paper on which some large letters were printed, and the mouth of the tube having been uncovered, the tube was inverted over it. When I considered that the preserved light had acted sufficiently, I treated the sensitive paper with gallic acid, and developed the picture which I have the honour to present to the Academy. If the paper had been prepared with the iodide of silver, the image would have been much more vigorous; but such as it is, it gives undoubted evidence of a real action exercised by the light, without any calorific radiations, and that is all I desire to demonstrate at present.

"As to the action of heat, I know that it exists since I discovered it by the experiments I have pursued for several months past, and which I shall shortly publish, contenting myself with saying, to fix a date, that by availing myself of the obscure radiation of a source of heat at 212 degrees F., I obtained, at will, negative or positive pictures, according to the preparation of the paper. The heat may then, in certain circumstances, produce results which in my early researches I attributed to the light. The calorific and luminous radiations incontestably exercise chemical actions, but really distinct, and which must not be confounded together, even though they act simultaneously. When the tube is heated in which the light is preserved, as I advised at an epoch when the distinction between the calorific and luminous rays was not very clearly defined in my mind, a more intense and more rapid impression is obtained, because the two effects combine to produce it; but, as I have shown, light alone, independently of any elevation of temperature and the intervention of aqueous vapours, suffices to give very vigorous impressions.

"As to the objection drawn from the fact that the image is not formed through a thin glass or mica plate, I may refer to my first memoir. It will be seen by that, in fact, that this activity communicated by the light does not traverse glass, and that it is the same with luminous radiations emitted by phosphorus burning slowly in the air; these do not indeed act on sensitised paper."—*La Lumière.*

THE FOTHERGILL PROCESS.—IMPORTANT MODIFICATION.

BY MR. A. KEENE.

A correspondent, Mr. John Draffin, in a recent number of the "News" states, that after several comparative trials of the "Fothergill," "Collodio albumen," and "Hill Norris's" processes, he has decided against the first named; for, though he has obtained some excellent negatives by it, it has, in his hands, been far less sensitive than either of the other two.

Allow me to suggest that, instead of purchasing the plates ready prepared, the way to obtain correct results would have been to have prepared them himself, had he done so, with—for stereoscopic size plates—the use of four drachms of distilled water for the washing, or, more properly speaking, diluting bath on the surface of the sensitised plate, as recommended by me in an early number of the "News," and also in my pamphlet, *thoroughly* washed the off albumen; placed the plates to surface dry on blotting paper upon *glass;* and, while the temperature remained under about 60°, dried them with artificial heat, not exceeding 120 Fahrenheit; at same time avoiding contact with new wood, both during and after preparation—he would not only have had no occasion to doubt the statement that, under favourable circumstances, a negative can be obtained with the minimum exposure of thirty seconds, but would have entirely altered his opinion of the comparative value of the three processes, and given the "Fothergill" the same preference as his late friend; probably writing as much in favour of it as a former correspondent in the "News," who brought home about *forty* good negatives out of five and forty prepared plates, all of which, he stated, were prepared before starting on his journey, and developed at leisure on his return.

My chief object, however, on this occasion, is not so much to draw attention to the above, as to a modification of the process by which the sensitiveness is increased three or four fold, which is simply the substitution of rather thin mucilage, of white gum arabic, 10 drachms, dissolved in 5 ounces of distilled water, with the addition of 6 or 8 grains of chloride of ammonium to each ounce; the manipulation to be conducted in every way the same as before. The use of this salt is not my own idea, but was suggested by a correspondent in a contemporary, who drew attention to the great increase of sensitiveness obtained by adding it to the albumen. This I found to be the case; but a still further increase by using it with gum water, as mentioned. The development of plates prepared with gum is also much quicker. Whether either of the modifications will give the exquisite half-tone and distance of the Fothergill process, remains to be proved by experience.

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

INSOLATION.

The insolation of the chloride of silver received from us an attentive study; for, it must be remembered, it constitutes the starting point of the photographic theory. Experiment has shown us that the ultimate action of light on the chloride of silver was the separation of its elements and the production of metallic silver. If, in this case, sub-chloride of silver is formed, this never happens, except in *the transition* state, and in quantities so exceedingly small, that one must consider them as *imponderable*, and entirely incapable of producing a photographic proof. This then is formed of metallic silver, free or combined, but not by sub-chloride of silver, as has been hitherto admitted. We had already established this fact in considering the proof on withdrawal from the fixing bath, but it was essential to establish that it subsisted before this bath re-acted upon it.

We shall here relate some of the experiments which have led us to this conclusion.

Although it may be admitted, generally, that the chloride of silver undergoes, under the luminous influence, a reducing action, it was nevertheless interesting to make clearly evident the liberation of chlorine which should accompany this reduction; we easily succeeded in accomplishing this, by putting very pure and well-washed chloride of silver in suspension in distilled water, coloured either by turnsole or indigo. In both cases, at the end of some hours, the liquors were entirely decoloured by the chlorine which was liberated, and of which it was besides easy to ascertain the presence, by pouring into the solutions a drop of nitrate of silver.

This first point established, we next proceeded to examine if this reduction gave rise to sub-chloride of silver or metallic silver.

To accomplish this we spread, in exceedingly flat dishes, dilute solutions of chloride of sodium and nitrate of silver, mingled in absolutely equivalent quantities. In a short time the chloride of silver was deposited and, thanks to its thinness, remained adherent to the glass of the dish; we then decanted and exposed the chloride in this position during several days to the solar action. The brownish precipitate thus obtained was found to be soluble in nitric acid in a remarkable proportion, with the formation of nitrous vapours; which indicated the presence of metallic silver, and the residue, scarcely tinted of a violet colour, was completely dissolved in ammonia.

Now, chemistry teaches that sub-chloride of silver is insoluble in nitric acid, and it has been known, ever since Scheele's time, that this body is decomposed by ammonia, and gives a precipitate of metallic silver. Hence, this compound is not found in any sensible quantity in the substance furnished by the insolation of the chloride of silver, and this latter was simply formed of metallic silver, of a mass of non-reduced chloride of silver, and of a trace, inappreciable by weight, of sub-chloride.

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* Continued from vol. ii. p. 75.

It is the same on a proof; in fact, if we treat directly by ammonia the substance obtained in insolating the chloride of silver, we get a very important residue of metallic silver, which, if we suppose it extended on a sheet of paper, might perfectly well produce a proof, while, if we make this substance undergo the same treatment, first depriving it of the metallic silver it contains, by means of nitric acid, nothing more will be left than an inappreciable residue, scarcely tinging the liquor, and quite incapable of colouring even the little filter in which an attempt may be made to collect it.

We know, then, now the part which the chloride of silver plays in the act of insolation, it is restored to the metallic state; but, as we know, the chloride of silver is not alone on the paper where the photograph is to be formed, and among the bodies which surround it, the nitrate of silver, as we have demonstrated, plays a conspicuous part in the production of the photographic result. We will now look for the explanation of this. We have already announced the result at which we have arrived on this subject, in saying that the nitrate influences the definitive production of the proof, by supplying, in a constant manner, a new aliment to the chloride which is liberated from the reduced salt of silver; that the chlorine attacks the nitrate in contact with it, forming a new chloride which blackens and is reduced in its turn, setting at liberty a fresh quantity of chlorine; finally, in adding that the chloride of silver, finding itself thus in larger quantity on a given surface, encountering besides, in a nascent state, the luminous rays which fall upon it, is influenced by them with a greater energy.

Sundry experiments enable us to verify these assertions.

If they are true, in fact, it will suffice to take the two halves of a sheet of sensitised paper, to keep one in darkness, while the other is submitted to an energetic light which may have the power to metallise it, and to estimate the quantities of chlorine remaining in both the one and the other. If, in fact, the chlorine, in proportion as it is liberated from the combination, saturates a fresh quantity of nitrate of silver, the sheet ought, in both cases, to preserve the same quantity. This is what experiment has proved, for in the insolated half of the sheet we found nearly as possible the same quantity of chlorine as in the sheet preserved from the influence of the light.

Besides, if we place chloride of silver in suspension in a solution of nitrate of silver, and expose to the solar rays, it will be found, after it has blackened, that the liquor does not contain free chlorine, but nitric acid which reddens turnsole, which implies the partial decomposition of the dissolved nitrate of silver.

(*To be continued.*)

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

Eyes.—Wash in the local colour of the eyes. It will be observed that brown eyes come out almost black in photographs. Here again is a difficulty which perplexes many—to make those eyes, which in the photograph are black, to appear bright and transparent, such as they are in life. Nothing can be more beautiful than a finely painted brown eye, with its luminous colour. We have succeeded best by first washing on an opaque yellow, say deep chrome, and then glazing with burnt sienna and vandyke brown, always using gum in glazing. When the chrome is laid on, it should be tolerably thick, so as to hide the dark colour of the photograph underneath; and, when dry, the picture should be again burnished, to make this smooth previous to glazing.

If the subject has eyes in which blue predominates, the photograph will give them *too light;* this offers an advantage, inasmuch as we can get them down to any depth or brilliancy by glazing with such colours as Antwerp or Prussian blue, or, if necessary, with neutral tint, or indigo added as the case requires.

But we have always to use brighter colours than would appear correct, strictly compared with the living model, because we have a grey (the photograph) underneath, which comparatively neutralises that laid over by being seen through.

So that having washed on whatever colour is required for the eyes, the hair, the shadows of flesh, give a few minutes for drying, then burnish well again.

If the wash over the shadows of the face and hair appears dim and flat, they can be fetched up by going over them with gum or medium. This being done, take crimson lake with medium, and faintly wash on the carnation of the cheeks; also feebly go over the ears with same; to this add vermilion for the upper lip, using vermilion alone for the lower one. Give a second wash on the cheeks of lake, keeping this wash within the first, which, being lighter, will be soft. Now take, with the medium, Antwerp blue, or any transparent colour, according to complexion; with this introduce the cool greys where they are required, such as side of forehead, temples, round about eyes, corners of mouth, under chin, neck, and by the sides of all deep shadows; which you have made warm with vermilion and yellow, because flesh is always grey by the side of shadow.

If the complexion be very fair, use more of this cool grey; if warm, it will be useless, or worse, tending to blacken the effect of what follows. Use the burnisher again.

Now begin by laying the colour on in small strokes with fine sable brushes, using medium in every touch. You will now, by holding both photographs at a little distance so as to get the general impression, see that the effect of your picture is *flat* compared with the dark copy, which results from your having reduced the white lights of your picture something by the first wash, and the shadows being lighter by washing on the tint of vermilion and Indian yellow, thereby comparatively destroying the strength or force of light and shade contrast in the head, and, moreover, causing much of the modelling to disappear. You have now to recover these properties, in doing which you may produce any amount of delicacy, any complexion, any touch you please, because repeatedly burnishing upon the paper has hardened it, so as to admit of nearly the same process as painting upon ivory; and whilst working in again the anatomy of the face, you can etch on the nicest tints to resemble those of nature. Here it may be well to speak of the necessity of painting from the living model; there you have presented to you the object naturally, which you will treat, to the best of your abilities, as you see it, and not as others would, because no two painters see the same thing quite alike, and if you try too much to imitate another's method of representation, and that method not, perhaps, as you yourself would see the thing, you will not be successful even in equalling that style you are endeavouring to follow, because no one can work well against his own feelings. There is an appearance of originality and truthfulness in works by artists whose practice is to paint everything from life, which at once distinguishes them from those by painters who have rather studied the works of others than nature.

However, to proceed, it is understood that we have now laid on the cool greys in various parts of the face, somewhat in excess of coldness, because over these we now commence by etching a general colour of warmth, regulated by the complexion; if a very fair one, lake, and a little Indian yellow; if warm, more yellow, with a little raw sienna, still further to deepen the tone if necessary. Use this, in various degrees, to work in the anatomy all over the face, the forehead first, and afterwards the cheeks; having done which with very feeble colour, go over, when necessary, again, a shade deeper, carefully graduating the tones, so as to round up the bones and muscles softly, making the stippling so soft as only to be just perceptible. This stippling is to be in large soft strokes, only perceptible in their effect, and simply to answer for washing, being substituted as calculated to render the face uniform sooner than could be by broad washes. Where on cheeks much warmth is required, use lake and burnt sienna in finish to deepen with.

The effect of going all over the head with one general colour, and that the colour of the complexion, is to produce a breadth and solidity, at once varied in its tints from the circumstance of those cool greys and bright laky colours underneath shining through. It may be considered as equivalent to glazing in oil.

(*To be continued.*)

Dictionary of Photography.

Chloride of Calcium.—This salt, from its powerful attraction for water, is of frequent use in the laboratory. It is usually prepared by dissolving chalk or marble in hydrochloric acid and evaporating. The salt may be obtained in the crystalline form by allowing a hot, strong solution to cool. If these crystals are heated to a temperature of 300°, water is expelled, and a dry, porous-looking salt remains, which contains two equivalents of water. In this state it is very useful for drying gases or air, and it is most likely used in this state to dry the atmosphere inside the boxes for preserving sensitive paper. Chloride of calcium, when heated to a dull red heat, parts with all its water of crystallisation, and fuses; forming, on cooling, a hard stony mass, which, when broken up, is of use for absorbing water from various liquids—ether, for instance. If a few lumps of this fused mass are placed in a bottle of ether, and the whole allowed to stand for a day or two, and then distilled at a gentle heat, the ether will come over anhydrous. Alcohol cannot be dehydrated in this way, owing to its forming a chemical compound with chloride of calcium. The formula of the anhydrous salt is $Ca\,Cl$.

Chloride of Gold.—This salt, in the solid state, is reddish brown, soluble in water, alcohol, and ether, and easily reduced to the metallic state by heat. Its mode of preparation will be found at vol. i., p. 216. It will not, however, be advisable to prepare it on a very small scale, since the unavoidable loss during the operation will make the result more expensive than if it had been purchased ready made. It is very deliquescent, and should be preserved for use either in glass bottles in which the stoppers are ground with extra care, or in hermetically sealed tubes. A better plan will be to dissolve it in water, in the proportion of one grain to each drachm of water, and preserve it thus in solution. Chloride of gold is represented, in chemical language, by the symbols $Au\,Cl_3$, and is thus seen to be composed of one equivalent of gold, and three of chlorine.

Chloride of Iron.—The protochloride, $Fe\,Cl$, being a salt difficult to prepare, and of no importance to photographers, we will proceed to the consideration of the perchloride, or sesquichloride, $Fe_2\,Cl_3$. This salt is formed by dissolving peroxide of iron in an excess of hydrochloric acid, evaporating to dryness on a water bath, and then adding water, filtering, and re-evaporating; it forms a very deliquescent dark red mass. Mr. Talbot has recently employed this salt for the purpose of etching on steel, copper, or zinc, by his new photoglyphic process. It acts, in this case, by giving up one third of its chlorine to the metal with which it is in contact, being itself reduced to the state of protochloride. The reaction is (supposing the etching to be on copper) $Fe_2\,Cl_3+Cu=2\,Fe\,Cl+Cu\,Cl$.

Chloride of Iodine.—When dry chloride gas is passed over dry iodine at the ordinary temperature, heat is evolved, and a solid chloride of iodine is the result. It is of an orange yellow colour, volatile, deliquescent, and soluble in water. Chloride of iodine was formerly much used in the daguerreotype process, but has been superseded by the bromide of iodine.

Chloride of Lime.—The chemical nature of chloride of lime has been explained at vol. i., p. 306. Owing to its powerful bleaching properties, it is much used in the manufacture of paper; and, being insufficiently washed out, frequently causes failures in the different photographic processes.

Chloride of Silver.—This salt is formed of equal equivalents of chlorine and silver. Whenever a soluble chloride comes in contact with a soluble silver salt, a white precipitate of chloride of silver is formed, which, when pure, darkens rapidly in the light. It is insoluble in water and acids, but soluble in ammonia, alkaline cyanides, and hyposulphites. It may be reduced to the metallic state by being mixed with twice its weight of dried carbonate of soda, and heated to bright redness in a crucible; the metallic silver will then be found at the bottom of the crucible in a lump. In the wet way, it may be reduced by being placed in contact with a piece of zinc or iron, and water slightly acidulated with hydrochloric acid; decomposition of the chloride of silver soon commences, which rapidly spreads through the mass, and presently the whole of the chloride of silver is reduced to the metallic state. If the chloride of silver were fused before this reduction, the resulting silver would appear as a white sponge, retaining the shape of the original lump; whilst, if it had been in the form of precipitate, the silver would appear as a dark grey powder, devoid of metallic appearance.

(*To be continued.*)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS—(*continued*).

Q. How was the experiment on the proofs conducted?

A. In the following manner:—A photographic proof, fixed with new hypo., was cut into six strips, one strip being immersed in each of the five baths, and one of them preserved as a test of the change which the rest underwent in the operation. The effect was produced with extreme rapidity. The three strips plunged into the sulphuretted liquid, after taking a violet tint, changed rapidly to the yellow tinge, so familiar to photographers. The strip exposed to the action of the hydrosulphuric gas grew somewhat deeper in tone: and that which was immersed in the sel d'or became of a violet colour.

Q. What conclusion was drawn from this experiment?

A. That no doubt whatever could exist as to the action of the sulphuretted liquids, but that the action of the hydrosulphuric gas was less plain. In order to ascertain how far humidity exercised an influence on the discoloration of the proof, each strip was cut into two parts, one being allowed to remain as before, the other being immersed in water for three hours. Those proofs previously immersed in liquid, underwent a very slight change, their tint being a little weakened; no change was observable in that which had been subjected to the action of the sel d'or, but the proof to which hydrosulphuric gas had been applied, rapidly changed to yellow. The conclusion founded on this experiment was, that all sulphurisation immediately changed the colour of the proof, or rendered it easily susceptible of change.

Q. How was the experiment continued?

A. Three of the hydrosulphuric baths had given the same results; but, to make the experiment more complete, and to meet all the objections which had been made as to the action of alkalis, in the baths of sulphide of ammonium and hyposulphite of soda, on the preparation of the hydrosulphuric acid, the experiment was repeated—the hydrosulpuric acid being used, perfectly pure, both in gas and in solution.

Q. How was this experiment conducted?

A. A proof, prepared with new hyposulphite of soda, thoroughly washed, was cut diagonally into four pieces; one of these pieces was submitted, for two hours, to the action of dry hydrosulphuric acid gas; the tint gradually changed to all the varieties of photographic colour—dark red, violet, brown, yellow brown, at which point the operation was arrested. The strip was then cut into two equal parts; one part being placed in water, where, in a few moments, the proof became completely yellow. Another strip of the same proof, sponged on blotting paper, and placed still wet in the preparation, changes to a yellow tint in a very short time. Both experiments established the fact, that a proof sulphuretted while it is wet, changes to yellow; and, that a proof sulphuretted dry, changes yellow as soon as it is immersed in water. After this, the action of a solution of hydrosulphuric acid is beyond the possibility of doubt. Subsequent experiment plainly confirmed the preceding results.

Q. What is the conclusion drawn from these experiments?

A. That in all cases, whatever be the mode employed, sulphuration and humidity united deteriorates the proof.

Q. Is the action of the hydrosulphuric gas sufficient to effect the operation without any kind of humidity?

A. This is doubtful; experiments, however, have shown that a proof perfectly fixed and exposed to the action of hydrosulphuric acid gas, subsequently turns yellow. This may have arisen from the humidity, still retained by the paper; other experiments made with proofs thoroughly dried before the fire, established the fact that such proofs did not change to yellow until slightly damped.

Q. What do we learn from these experiments?

A. The instability of all positive proofs tinted in the baths generally employed. In these baths the hyposulphite is affected by the presence of acids or metallic salts, and under these circumstances the proofs not only undergo unfavourable transition in the bath, but are rendered susceptible of subsequent changes when removed from it, the hydrosulphuric acid being changed to sulphide.

Q. Does this conclusion agree with former experiments?

A. It does; experiments have been made with old and new proofs, and always with a like result; submitted to analytical investigation they have yielded sulphur generally in chemically equivalent proportions to the silver. The destructive action of the sulphur upon positive proofs is demonstrated by analysis, and established by chemical theory, and the general conclusion is, that the sulphuret of silver, however applied, always changes yellow as soon as it is washed or damped.

Q. Do not all proofs fixed or tinted by sulphuration sooner or later disappear?

A. They do; and for these three causes are assigned:

1. The presence of acids in the hyposulphite of soda, which, immediately disengaging the sulphurous and hydrosulphuric acids, leaves on the proofs deposits of sulphur in its native state.

2. The presence of the salts of silver in the fixing bath.

3. The presence of hydrosulphuric acid in the air.

Q. How is the presence of the salts of silver accounted for in the fixing bath.

A. It is easily accounted for in the following way:—In fixing a positive proof in hyposulphite of soda while the proof is still covered with nitrate of silver, that substance mixes with the hyposulphite. If in a common solution of hypo we let fall a drop of nitrate of silver, a white precipitate is instantly formed, which disappears on shaking the solution. The same thing occurs the moment the proof is plunged into the fixing bath. The quantity of matter thus dissolved is very considerable; but a still greater difficulty has to be contended with. Under the action of nitrate of silver, hyposulphite of soda is decomposed; hyposulphite of silver is in its turn decomposed; the precipitate forms sulphuret of silver, and immediately after the decomposed hyposulphite of soda, leaves a deposit of sulphur in its native state. The same action goes on with the proof, and the sulphur deposited in the proof causes it in time partially or wholly to disappear.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, April 26, 1859.

Indisposition has prevented our visiting a second time the Exhibition of Photography; so that we find ourselves obliged to postpone until next week the continuation of our remarks upon it.

M. A. Civiale presented, last Monday, to the Academy of Sciences, the photographs we spoke of in our preceding letter. The view of the "Pyrenees," which we noticed, is composed of four proofs joined together. To produce them, the camera was placed at an elevation of 2,200 yards above the level of the sea, and the horizontal distance from the mountain range was about 2,000 yards. A second panorama composed of the proofs represents a view of the "Maladetta and its Glaciers," taken from the port Venasque (environs of Tuchon). The station for this was situated 2,507 yards above the level of the sea. The horizontal distance which separated the camera from the mountains to be focussed was 4,300 yards. The negatives of these proofs were taken on dry waxed paper. M. Civiale thinks that these descriptions of studies will not only give an excellent idea of the general configuration of mountain ranges, but that the heights of some of the inexplorable peaks may thus be ascertained by taking, as a starting point, heights already determined. The heights already known, and the maps of the country, will give the distance which separates the camera from the vertical lines passing through the different summits; the vertical angles of these summits must then be measured from the station of the camera, and the approximate height of any peak will be obtained by multiplying the base line by the sine of the vertical angle: $h = AB \sin. \alpha$.

At the last sitting of the Academy, M. Gaultier de Claubry demanded that a sealed paper, deposited by him on the 7th March last, might be opened and read. The principal facts it contained are, "that he had been led to make some comparative essays on the influence of light and heat in the production of images on sensitive photographic paper, and had already obtained results which promise success. The paper sensitised with aceto-nitrate of silver, nitrate of uranium, or gelatine and bichromate of potash, placed from 10 minutes to an hour on a sheet of printed paper, and heated to 100° or 120° (centigrade), reproduce the images of printed characters in black ink, but hardly those in red ink; a result analogous to that obtained by M. Niepce with light alone."

Sig. Secchi, director of the Observatory of Rome, continues to devote his large refraction telescope to photography. He has lately obtained some very interesting photographs of the planet Saturn. His well-known photographs of the Sun have been distributed among astronomers, and are already to be seen in many observatories.

The *Astronomische Nachrichten* publishes a series of experiments on stellar photography, made under the directions of the late Mr. Bond, by Messrs. Whipple and Black, during the year 1857-8. Stars have been classed by astronomers according to their apparent magnitude; thus we have stars of the first, second, third, tenth magnitudes, &c., according to the intensity with which their light strikes the eye of the observer. The end that Mr. Bond had in view was to determine if it were possible, with the aid of photography, to arrive at a new classification of stars, by replacing the uncertain visual appreciation to which we have just alluded, by the action which star-light exercises upon photographic paper; thereby substituting real measures for the purely optical determinations which have hitherto been in use. Mr. Bond had already made considerable progress in these interesting studies at the time of his death.

M. J. Müller has lately published in *Poggendorff's Annalen* an interesting memoir on the heat of the solar spectrum, in which he has studied especially the absorption of the heat by differently coloured solutions. In the next place he has attempted to ascertain, by means of certain thermo-electrical apparatus, imagined by Melloni, the length of the wave or undulation of the calorific radiations which are met with at the uppermost (least refracted) part of the solar spectrum.

Some preliminary experiments made with a prism of crown glass showed that the calorific spectrum spread itself, above the red rays of the luminous spectrum, over a space very nearly equal to that occupied by the whole of the latter. A result slightly different was obtained with a prism of rock-salt. This part of the author's memoir merely confirms some observations made many years ago by Melloni.—When differently coloured solutions were made to intercept the luminous rays, the following observations were made:—The coloured solution was, for this purpose, placed in a glass vessel with parallel sides, so that each solution employed had the same thickness.

1st. *A solution of cochineal* allowed the red ray of light alone to pass; all the other colours were extinguished.

2nd. *Bi-chromate of potash.* This dissolution allowed the red, the orange, the yellow, and a little of the green to pass.

3rd. *Chloride of copper.* This dissolution absorbed all the colours except the green, which remained, but which was slightly modified.

4th. *Ammoniacal sulphate of copper* allowed only the blue, the indigo, and the violet, to pass.

Respecting the calorific effects, if we represent by 100 the quantity of heat which passes through a layer of pure water of the same thickness as the preceding solutions, we find, by taking the mean of many results, that the proportion of heat which passes through the different solutions is as follows:—

For the red solution (cochineal)	40
,, yellow solution (bi-chromate)	74
,, green solution (chloride of copper) ...	13
,, blue solution (ammoniacal sulphate) ...	13

Whence M. Müller concludes that the quantity of heat distributed over the solar spectrum is thus:—

In the violet, indigo, and blue rays	13
,, green rays	13
,, yellow and orange rays	34

As to the quantity of heat in the red rays, it is nearly impossible to determine exactly, as we cannot assure ourselves that the red solution did not give passage to any of the calorific rays situated above the red, which are invisible. M. Müller thinks (and in this he is of the same opinion as M. Franz) that about 50 per cent. of the rays which pass through the red solution are invisible calorific rays. This would leave 20 or 30 as the expression of the quantity of heat distributed over the red ray of the solar spectrum.

In attempting to find the length of wave for the heat radiations of the extreme end of the spectrum (*i.e.*, the uppermost extremity, consequently the least refracted), M. Müller has arrived at the figures (in millimetres) $0^{\text{mm}},001770$ and $0^{\text{mm}},001900$, the mean of which, $0^{\text{mm}},00183$, may be considered as representing the length of an undulation of a ray of heat from the extreme upper portion of the solar spectrum.

Messrs. Cornalia and Pancreri have lately presented to the Royal Academy of Sciences at Turin, an interesting memoir on a newly discovered animal belonging to the large family of Crustacea.

The crustacean in question is a small representative of the tribe *Bossyridæ;* it lives as a parasite in the gills of a sort of crab, which is very common in the *laguni* of Venice, and which belongs to the genus *Gebia.* From this circumstance the newly-described animal has been termed *Gyge branchialis.* The Gebia, on which this parasite lives, are easily recognised by a kind of swelling or tumour on the anterior part of the body (the cephalothorax). The *Gyge branchialis* presents the general organisation of Isopodous Crustacea, of which tribe a common species inhabits the gills or the branchial cavities of prawns. One of the most curious characteristics of *G. branchialis* is, that its body is non-symmetrical,—one side is always longer than the other; the right or left side is longest according as the animal inhabits the right or the left gill of the crab upon which it lives as a parasite.

Messrs. Henri Sainte Claire Deville and Debray have just terminated a considerable work on Platinum, and the metals which accompany it in nature. By means of their crucibles of lime, and with common gas mixed with oxygen as combustible, they have actually melted all at once a mass of platinum weighing more than 23,000 pounds! A metallurgical feat never before performed. Their great object in the work of which we speak has been to obtain pure platinum, and also to extract from its gangue the other metals with which it is always associated, such as osmium, rhodium, iridium, &c., so as to form new alloys of these with platinum.

Platinum gangue, and residues of platinum works, have been sent to Messrs. Deville and Debray, from Columbia, Oregon, California, Australia, Spain, Russia, &c. After a most laborious series of manipulations, they have succeeded in discovering new methods for obtaining pure platinum, and have made some alloys of this metal with iridium and rhodium, which may sooner or later become useful in the Arts. One of the most curious scientific results which they have arrived at, concerns the specific gravity of osmium. This metal, which has, perhaps, never before been obtained in a pure state, had a density of about 10 assigned to it by Berzélius. Messrs. Deville and Debray have shown that it is the heaviest metal known, and that its specific gravity is 21.40; that of platinum and iridium never exceeds 21.15.

At the last meeting of the Paris Academy of Sciences, a most important election took place—namely, that of a foreign member to fill the vacancy left by the death of the late Robert Brown, one of the greatest botanists ever born. As there are 65 members of the academy, but only 8 foreign members, it is a greater honour to be elected a foreign member, than to be one of the 65 titular members of the academy. The candidates presented were on the first rank, Mr. Richard Owen, of London; on the second and alphabetically—Messrs. Airy, of Greenwich; Ehrenberg, of Berlin; Liebig, of Munich; Murchison, of London; Plana, of Turin; Struve, of Pulkowa; and Wöhler, of Gottingen. Richard Owen was elected by 41 votes against 5 given to M. Plana, 2 to M. Wöhler, 2 to Sir Roderick Murchison, and 2 to Mr. Airy.* Liebig, Ehrenberg, and Struve, although very great names, did not obtain a single vote!

At the same meeting, M. Dujardin, of Rennes, the well-known zoologist, was selected corresponding member to fill the vacancy left by the death of Prince Charles Bonaparte.

PEOPLE IN THE MOON.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—By Mr. T. P. Barkas's letter in the "PHOTOGRAPHIC NEWS" of this week, he seems to me to be labouring under a pleasing delusion with regard to the practicability of distinguishing, by means of telescope, photography, and microscope, objects in the moon of the small dimensions of which he speaks. I beg to differ with him on this point for the following reasons, viz., since it takes a finite time to photograph the moon, there will be (besides the error caused by refraction of every ray which falls upon the sensitised plate) a great change in the relative position of any object in the moon, on account of her librations in latitude and longitude, which, in so delicate an operation, will not be inconsiderable, so that anything of the size of a rat will have moved relatively to the sensitised plate both in latitude and longitude, and would, therefore, be denoted by a tortuous curve, since the librations in latitude may at one time be greater, and at another time less than those in longitude. Again, allowing that a very small object, as a rat, can be got successfully on a plate, I imagine that a microscope which could magnify so small an object to a capability of being distinguished, would so magnify the imperfections of the best collodion and manipulation, as to make these errors manifold more discernible than the object. When we can get our collodion to such a nicety that no microscope can detect the slightest impurity in it, and when we can get a room for the manipulation so free from dust that no microscope can detect a deposit on the wet film, and when we can find a manipulator who can develop, &c., with the requisite accuracy for so delicate a picture, and when we can find an equatorial which will get rid of any error caused by the moon's librations, and the molecules of the atmosphere will cease to obstruct the pencils of light necessary for so beautiful a discovery as minute objects in the moon—then, I think, and not until then, can we reasonably hope to distinguish small objects in the silvery Eye of Night.—I am, Sir, yours obediently, J. C. Browne.

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* It deserves notice that of the 8 foreign members of the French Academy of Sciences, 4 are Englishmen. These members are at present—Humboldt, Faraday, Brewster, Tidemann, Mitscherlich, Dirichlet, Herschell, and Owen.

Cambridge, April 23rd, 1859.

Miscellaneous.

We take the following from the same source which furnished the linseed receipt for removing silver stains:—"It has long since been observed, without any explanation being offered to account for the circumstance, that persons have received *sunstrokes* in the shade, and even when the sun was obscured by clouds. Quite recently MM. Desprets and Foucault have received similar sunstrokes, not only in the shade, but in the shelter of their laboratories. This happened while they were trying some experiments with the electric fluid. M. Desprets has stated that, after standing a little while before a Bunsen's pile of two hundred couples, he experiences almost instantaneously all the symptoms of a sunstroke; that is to say, pain in the head, smarting in the eyes, redness in the face, and the conversion of the skin into scales. Some time previous to this M. Foucault was using a Bunsen's pile of twenty elements, and deprived of its glass handles. The experiment lasted rather more than an hour, but frequent interruptions did not allow the battery to be used more than twenty minutes altogether. Neither M. Foucault, nor a friend who assisted him, felt any sensation of heat in the face. Nevertheless, on the following day, both of them bore on their faces an erythema of a purple colour, with a sensation of restraint and tension. In M. Foucault's case the right side of the face was exposed to the luminous focus, and the redness was entirely on the right side from the roots of the hair down to the chin. In his friend's case, the redness was confined to the forehead, owing, apparently, to his having been obliged, during the experiments, to stand with his head bent down. In both instances the skin on the parts attacked had precisely the appearance that would have followed a sunstroke. A slight desquamation ensued, which lasted five or six days. No such effect followed when the electric light was passed through glass coloured with uranium. Hence it is pretty certain that sunstrokes derive their origin, not from the yellow calorific rays or the red light rays, but to the violet rays known as the chemical rays; these, as is known, determine the combination of chlorine with oxygen, and decompose the chloride of silver. From this discovery, due to chance, that greatest of inventors, it follows that not only is the sun deprived of one of its properties, but the moon participates in the spoliation. We often hear country people (in France) speak of *moonstrokes*, and which are frequent and almost inevitable in New Grenada. Now all this is explained; the moon has been wrongfully accused, and what we have related above is another proof of the innocuousness and the insignificance of the action of her light. There is one more erroneous expression to be changed. No doubt it will one day disappear, but when? The *routinière* notion which still insists on using the terms an "ounce," a "league," a "foot," in spite of the promulgation of the metrical system three-fourths of a century ago, will not speedily rectify an expression which use has made almost a proverb. Ten generations will doubtless roll away before they will submit to sound sense and say, '*I have received a chemical ray stroke.*'"

Life in the Moon.—A circle of one second in diameter, as seen from the earth, on the surface of the moon, contains about a square mile. Telescopes, therefore, must be greatly improved before we could expect to see signs of inhabitants, as manifested by edifices or changes on the surface of the soil. It should, however, be observed, that owing to the small density of the materials of the moon, and the comparatively feeble gravitation of bodies on her surface, muscular force would there go six times as far in overcoming the weight of materials as on the earth. Owing to the want of air, however, it seems impossible that any form of life analogous to those on earth can subsist there. No appearance indicating vegetation, or the slightest variation of surface which can, in our opinion, fairly be ascribed to change of season, can anywhere be discerned.—*Sir John Herschel's Outlines.*

The Colours of Natural Bodies.—M. Prevost states that the colour of bodies, as commonly observed, is altered by the white light which comes to the eye mixed with the rays producing the colour; this white light, however, may be removed by a series of reflections from surfaces of the same substance, and at the same time the relative intensity of the true colour will be augmented. Thus a ray of light, reflected several times from polished surfaces of gold, is at last deprived of all undecomposed white light, and gives a deep red orange as the real colour of gold. The colour of copper obtained in this way is a scarlet, that of silver a fine yellow, and that of tin a deep golden yellow of the common hue.—*Journal of Science and the Arts.*

Photographic Notes and Queries.

IMPROVED DEVELOPING BOX.

Sir,—Every one who seeks for instruction on any point or a means of overcoming any difficulty, by applying to your valuable paper, does good to his neighbours as well as to himself.

I was in the very same dilemma the other day as one who applied to you; having poured a lot of silver bath into about 6 ounces of positive developing solution, I was about stating my case and asking you for help, when your paper came to hand, and I have since recovered my silver. "Every little helps," especially to a beginner, and I wish to tell those of your readers who have developing boxes how to make them really of use, for to tell the truth I could not do anything in mine till by good fortune I thought of substituting an overcoat for the *top*. I got my box made like one described in the last number of vol. i., having an armhole on each side, a glass in the end and one in the lid, through which to look; this last I found quickly got covered inside with moisture, and that generally at the most critical time—when the development was drawing near an end. I could not see what I was about—I saw indeed but badly before the glass got clouded. Then in drawing up the dipper out of the bath, unless your box is very deep, you have not room. Yesterday I gave it up in despair, and it was one of those beautiful photographic days that so seldom come. I had not even yet succeeded in producing a negative that I thought warranted me in putting down my name on the club list. I took off the cover and tacked my "poncho" round the outside of the box, beginning over the end window and fastening it on each side about half way, just over the armholes: now, by throwing the cloak over the shoulders and stooping into the box, having the breast close to the edge of the end opposite the light, and the arms through the sleeves, one can work beautifully; if it is requisite to shift anything out or in, as for instance when it is requisite to put a coated plate into the bath, hold the plate in the right hand, insert the left under the cloak and in through the elastic of the sleeve; then, the covering cloth not being yet over your head, and not even wholly over the box, place the plate in the left hand, stoop down the head, and with the right draw over it the cloth, and bring the sides close under the chin. Now press the chest against the edge (this secures the cloth and prevents any leakage of light), and then insert the right hand, which as well as the left is now free to work with; in this way anything can be shifted in or out in one tenth of the time necessary to describe it; and when once this plan is tried I am sure no one will again resort to the lid, to take which, by the way, on and off with one hand, one being inside to give or receive anything, is far more troublesome than the way I have described. You can watch the development then as easily as in a dark room, and when once the development is stopped and the plate washed there is no necessity for continuing with your head in *a bag*, you can fix in the open air. I also do the coating outside, and I find, by having a deep cover, something like the cover of a bandbox, made of gutta percha, to fit easily over the bath top, *but having a slit through which the glass dipper goes up*, that one can uncover the box altogether, even when a plate is in, without any bad consequence. I need say no more, but that the three prints I inclose are from the three first negatives I ever took in my life. I never before succeeded with a negative, and I would wish to know from you, are they good enough to warrant me putting down my name on your list for exchanging pictures?

A Kerry Man.

THE COLLODIO-ALBUMEN PROCESS.

Sir,—Your correspondent "Photos" is unsuccessful with the collodio-albumen process, and asks the cause "why the film cracks in the fixing?" Without seeing a plate, I could not with certainty tell him what is the cause; from his description, I suppose it to be a "wrinkling" of the film, such as would be the case if the picture were fixed with cyanide instead of hypo. This is an expansion of the film, making it too large for the plate. I would suggest that he should fix by pouring on the hypo. instead of placing the plate in a dish, washing it carefully, and drying quickly. The alcoholic collodion your correspondent uses is not by any means the best. Any of the good negative collodions will do; some are much better and more rapid in action than others, and I should strongly recommend your correspondent to try one or two plates, before he ventures to prepare as many as forty. I know an instance of a person reading of a very simple negative process; he purchased a camera, prepared six dozen plates, took them to Ireland, and exposed them all; on his return, instead of six dozen pictures, he had as many dirty glasses. Of course, he blamed the process, instead of his own folly in making no trials before he went from home. No process yet discovered is absolutely certain, but I think the collodio-albumen is the nearest perfection of any, if proper precautions be taken. I have gone from home with twenty-eight sunshine plates, and at the end of three weeks have developed twenty-eight faultless negatives. But this is the exception; it rarely happens that one has not a failure or two, but even these are useful, if the "causes of failure" are carefully investigated and noted for future guidance.

Josh. Sidebotham.

PORTABLE TENT.

Sir,—In the "Photographic News," vol. ii. p. 82, is a description of a dark tent by F. R. E. May I beg to be allowed to state that the mode of constructing the framework, which constitutes its chief peculiarity, is identically the same as that adopted in the tent which was first exhibited by myself at a meeting of the Blackheath Photographic Society in November, 1857, and, subsequently, at the North London Society, and others. My tent is made of light wood instead of iron, as proposed by your correspondent, and is rendered still more rigid by the addition of a table, which is so fitted as to complete the system of triangles of which the frame is composed, and which constitute the chief feature as to its originality, and by which great rigidity, combined with lightness, is obtained. The arrangements of doorway and window are the same in your correspondent's plan as in my own.

C. W. Smartt.

[We have in vain searched for a description of a tent similar to the one described by "F. R. E." in the "Photographic News" for April 21, 1859, and published anterior to that date.—Ed.]

PHOTOGRAPHIC PERAMBULATORS.

Sir,—I owe you my best thanks for your obliging insertion of my letter relative to colouring magic-lantern slides, and likewise your correspondent Harry Bellini for his useful and well expressed hints on this subject.

By way of adding my mite to the numerous appliances which are, no doubt, being coopered up in every part of the kingdom for the approaching summer campaign, I send you the enclosed pen and ink sketches of a photographic perambulator, which, I believe, will meet all the requirements of wet collodion in the field.

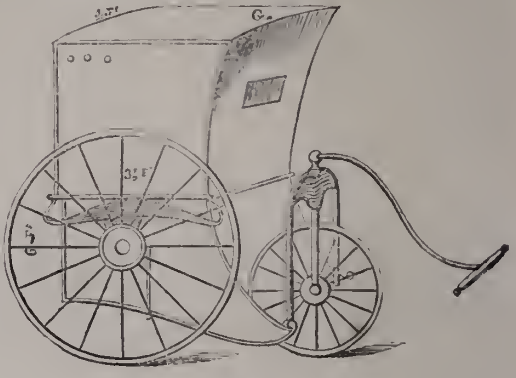

Fig. 1.

Fig. 1 represents a side and front view of a light carriage suited to any size of plate. It may be constructed of light, tough framework (Canadian walnut wood is, probably, the best), and lined inside with American cloth, or lightly boarded over and varnished. Fig. 3 represents the back closed up; when wanted for use, the two knobs A A must be seized and the doors pulled open. This movement elevates the hinged roof B in Fig. 2, allows the shelf C C to drop down to a level with the operating shelf D D, and scatters

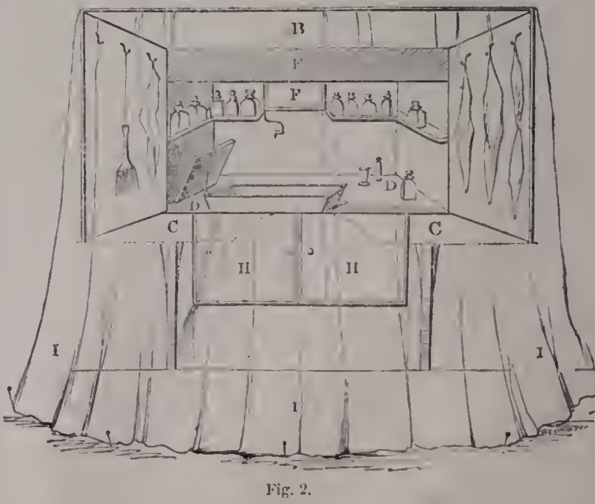

Fig. 2.

the curtain I to the ground. The front of the shelf C C, is curved out to allow the operator to get close to his chemicals, and also to kill any chance ray of light which might penetrate from beneath. When the curtain, which is carefully tacked all round the edges of the doors and elevating roof with a short length depending from the operating shelf, is drawn and crossed over in the centre, the photographer will find himself in a convenient dark chamber lighted by one small window F of dark yellow glass, placed in front. Immediately above it is a strong zinc reservoir E for water, extending the whole breadth and nearly the depth of the perambulator. It is filled from the outside at the screw plug C, and is capable of containing about twenty gallons—a quantity sufficient to quench the demand of a very thirsty operator. The two chambers H H, are intended to hold the camera and stand, box of plates, plate cleaner, and probably a paper of sandwiches, with the usual accompaniment of a nice little bottle or two of pale ale. The rest of the details are self-evident from the sketches, and may be modified to suit the convenience of each individual.

The dimensions are—Fig. 1, height 6 feet, breadth 4 feet, depth at the narrowest part $3\frac{1}{2}$ feet, wheels about 4 feet in diameter.

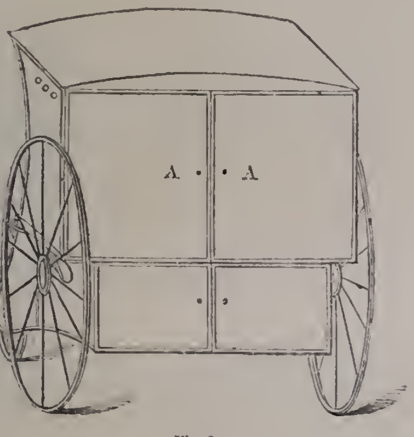

Fig. 3.

I feel certain the foregoing will meet the exigencies of many a photographer who, instead of spending money on dry plates, will boldly march to the field with his perambulator before him, flourishing his collodion bottle as his standard, and who will not desert his colours till either his developer is exhausted, or his box crammed with good negatives.

William Cochran.

PHOTOGRAPHS IN NATURAL COLOURS.

Sir,—In reply to your correspondent H. I. S., as it is about three years since I obtained the photograph in natural colours I mentioned, I have forgotten where I purchased the collodion I used on the occasion, otherwise I could probably ascertain how it was iodised. It was negative collodion, and had been iodised the day previous. The bath was a 30 grain one; I do not remember whether it was new. The developer—

Pyrogallic acid	6	grains.
Acetic acid	$1\frac{1}{2}$	drachms.
Alcohol	$\frac{1}{2}$	drachm.
Water	8	ounces.

I was desirous of trying what would be the effect of very white light and operating as for negatives, but with very short exposure. I therefore placed a white sheet between the sitter and the sun, which was shining brilliantly, and I had also a white sheet as a background. The lens was a small "quarter plate" portrait, with the full aperture and the exposure as for positives. I did not find the colours appear during development, which was carried on by the light of a candle placed high up, but directly the hypo.—a saturated solution—was poured on the plate, the colours started out very bright and clear. Although all the pictures I took that morning, between 11 and 1 o'clock, and on other occasions, showed the natural colours, only one retained them after drying, and why this should have retained them I cannot understand. The only difference between it and the others is, that the deposit of silver is rather thinner; the colours in all were nearly as bright on the reverse as on the collodion side. I should mention that a purple dress gave the complimentary colour yellow; but one, a pale yellow with brown figures, gave the colours perfect. I am disposed to attach little or no value to anything yielding such uncertain results; perhaps, however, it would be worth while to make some experiments with the prismatic colours in *very white light*, and for this purpose I should recommend that the colours should be painted in broad bands with *transparent* colours on a white ground, that will not absorb them, as porcelain or a canvass prepared with white.

I think your correspondent would not find the transferred film answer except for positives by *transmitted* light, as the whites of the pictures even on paper would not be clear. I think positives on albumenised paper, burnished on the back with an agate burnisher, would have nearly as much delicacy and finish as collodion. I inclose you a small burnished positive.

Thomas Barrett.

CREASING OF THE COLLODIO-ALBUMEN FILM AFTER FIXING.—HINTS ON THE FOTHERGILL PROCESS.

Sir,—I have met with the same difficulty as your correspondent "Photos," in the "News" of April 21, the creasing of the film after washing away the hypo. The other day, at the meeting of our Photographic Society, I laid my case before the meeting, and one of the members helped me to the following solution of the difficulty, which I have since found correct. When hypo. is alkaline, it creases and curdles up the albumen film on collodion; by adding a few drops of acetic acid, the alkaline action is removed, and the result is an even surface. Some samples of hypo. are decidedly alkaline, and, therefore, when purchasing new hypo., it is advisable to test for alkaline action, and if it is present add the acetic acid.

I have of late slightly altered my working of Fothergill's process with advantage, which may also be worth communicating to your readers. The greatest difficulty after getting suitable materials (and that is an important matter), is the washing after the nitrate bath; many condemn the process, because they fail in this; any gentleman that has found his plates unevenly sensitive will find a great improvement by using two baths. I use a bath 35 grains of nitrate silver to the ounce, then transfer the plate to a 2 grain bath; both of these should be neutral, or give only a slight acid reaction to test paper. Drain well after the latter bath, and for a stereoscopic plate, pour over 2 drachms of filtered rain water, and run it round once or twice; drain again, and coat with albumen as usual. By this plan unequal sensitive places are avoided, the great drawback in this process. I fixed the plates much quicker than collodio-albumen and sooner developed. A bright clear negative is the result, quite equal to wet collodion, if the exposure is well timed.

Manchester. J. H.

IMPROVED DISHES.

Sir,—I think the following may be of service to many of your readers.

To make a nice developing dish:—Select a flat piece of glass and cut it to the size of your gutta percha dish, so that it will just fit on the bottom; then, with a little shellac varnish, or gutta percha solution, fill up the edge to prevent the developing solution from finding its way beneath the glass plate. If done neatly, you will have a capital dish, with less cost and less liability to be broken than a glass one.

G. W.

ANSWERS TO MINOR QUERIES.

Glass Triangles.—*Talbotype.* Glass triangles will be found exceeding useful in many operations of the talbotype and other processes. One may be easily made. Take a piece of solid glass rod about fifteen inches long and a quarter of an inch in diameter, and divide it into three equal parts by two dots of ink on it; then hold it in the flame of a gas burner or spirit lamp at one of the marked places (introducing it gradually to avoid danger of the glass cracking), and when soft bend it to an angle of 60°. Then repeat the operation at the other marked place, and the result will be an equilateral triangle. A very skilful operator may now fuse the two ends together with a blowpipe, but the generality will do well to remember that it is better to "leave well alone." In immersing paper in various baths, a few of these simply constructed glass triangles will save a great deal of handling.

Restoration of Old Hypo. Baths.—*Aristarchus* asks if he cannot precipitate the silver from a large quantity of hyposulphite of soda solution which has become saturated with iodide of silver, in such a way that it can be rendered available for fixing fresh pictures. If solution of sulphide of ammonium be added to the hypo. solution until after brisk agitation the solution still smells slightly of that reagent, all the silver will be precipitated in the form of sulphide of silver as a black powder, which may be filtered off and reduced to the metallic state by one of the methods described in our first volume, whilst the solution will contain, along with a slight excess of the sulphide of ammonium, the hyposulphite of soda in a state ready for use again. As, however, the presence of the smallest quantity of free sulphide of ammonium in the hypo. will prove very injurious to the pictures which are to be fixed in it, the solution must be heated to ebullition, and exposed to the air in a shallow vessel, until all smell has disappeared from it. This plan answers perfectly well for the hypo. bath which is employed in the collodion process, but is not quite so successful when used for positive printing, as the tones of those pictures which are first immersed in the renovated bath are liable to suffer materially.

Packing Bottles in Cork.—*Zeuxis* inquires the best plan for packing bottles in a case for tourists' purposes, to avoid danger of breakage. We strongly advise the adoption of a very excellent suggestion of Mr. Sisson's, namely, to divide the box in which the bottles are to be packed by means of thin sheets of cork. The bottles should be *square* and they should fit tight enough to require *pushing* into their places. The advantages of this plan are evident, and we think that it should be generally adopted. Cork is light, inexpensive, will stand all climates, gives to pressure, is easily glued, and can be procured almost everywhere.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Pest Office authorities.

H. S. I.—1. We will forward the letter as soon as we can find the address. 2. Your plan seems quite as good as any we have seen, and with your permission we will give it to our readers. 3. Your bath has become charged with organic matter, and no amount of acid will, therefore, prevent the fogging. Try the following plan:—Place ten or a dozen grains of metallic cadmium into a perfectly clean flask and pour the bath in; boil violently for about a quarter of an hour, then filter, and make very faintly acid with acetic acid. We do not doubt that this will prove an effectual remedy.

Henry N.—Received.

Excelsior.—Your two specimens of glass positives arrived too much broken for us to be able to form any judgment upon them. From your letter, however, we think that you would obtain the tone you want by practising the alabastrine process, for which see our first volume.

A L.—The fault is in the collodion. Use one giving a rather thicker film.

A Regular Subscriber.—1. We cannot answer such questions; apply at one of the photographic houses who advertise in our columns. 2. See opposite. 3. Filter off from the precipitated carbonate of silver, and then slightly acidulate with acetic acid.

L. J. Gaskill.—Received.

Sol.—1. Great experience is required in order to get even passable results with the processes you have attempted; they must be regarded more in the light of curiosities than anything else. 2. When *parts* are mentioned in a formula either drachms or ounces may be taken, or any convenient subdivision, and solid and fluid measures may also be considered as mutually convertible. 3. Pinholes in the negative may arise from many causes. Iodising the collodion with impure iodide of potassium, or not allowing it to settle well, are among the most frequent causes.

Tento.—1. We prefer the lenses you have called No. 4. For chemicals try the house No. 2. 2. We shall be very pleased to receive a description of your improved apparatus. 3. The difference in the apparent velocity of a ray of light, caused by the rotation of the earth, is too trifling to have any effect one way or another. The earth revolving at the rate of 1,000 miles an hour would, it is true, cause us to meet the rays of light at sunrise and move away from them at sunset: but the velocity of our translation to or from them would only be about 16 miles in a minute; and it cannot be imagined that this quantity added to, or subtracted from, a velocity of 12 millions of miles per minute would alter the photographic effect of the light. Were it possible to be carried forward towards the source of light with a velocity at all commensurate with that of the light to us, the first effect of such a movement would be an alteration in the colour of the light, each coloured ray would amount higher towards the violet end of the spectrum, owing to the increased apparent rapidity of vibration caused by the rays being *met* at such an enormous velocity.

Revd. T. Banner.—We have a letter waiting for this gentleman; to what address shall it be posted?

F. Woodward.—We will endeavour to obtain the information you require.

P. Atherton.—We can only reply to your questions by recommending you to have as much glass as possible, both on the roof and sides of your glass room.

W. F. M.—Received.

H. F. St. J.—We have answered your queries by post.

"Pilot."—There is an error in the first statement; that at p. 224 is correct.

E. M.—We prefer the picture taken with the ⅜-in. stop. The negatives are tolerably good, except in the skies, but the prints are too red.

R. Gordon.—Received with thanks.

A. Henderson.—Your stereograms are very beautiful, and we shall have great pleasure in inserting your name. Your success with Fothergill's process is very complete. Can you not favour us with some account of your experience in that, or any other process for publication?

A. G.—See answer to *Sol.*

Apparatus for Washing Positives.—It has been pointed out to us that Mr. Hayes has overlooked Mr. Barrett's description of an apparatus for washing positives at vol. i., p. 111, or he would have seen that his and Mr. Barrett's contrivances were similar.

Ebeniste.—Consult the index of vol. i.

Ignoramus.—We have heard no account of the process farther than what the inventor gave. If you cannot succeed at it, we advise you to stick to O's, which we really can recommend. As soon as we have time, we intend to try the experiments referred to.

A. R.—The word collodion is derived from a Greek word signifying *glue*, owing to its adhesive nature, which was first made use of for adhering to the skin, and forming a protecting coat over wounds, &c. The word collodion now has become thoroughly Anglicised, and, as is frequently the case, is used in other than its strictly etymological meaning. Thus, it is perfectly correct to speak of a solution of cellulose in oxide of cuprammonium, as a new kind of collodion.

An Amateur.—Two letters received.

D., Kirkaldy.—We would willingly insert our correspondent's name but it is not written sufficiently legible for us to read it.

Zetetic.—Answered in the present number.

X. P. R.—We shall always be glad to receive articles from our correspondent on so interesting a subject. The reason why a diaphragm should be at a certain distance in front of the lens, instead of close to it, is that in a corrected lens, *oblique excentrical* pencils of rays come to a focus more nearly in the plane of the focussing screen, than oblique *centrical* pencils: by oblique, we mean pencils from objects which form the margin of the field of view.

Common Salt.—1. An erecting eye-piece will be required, which is almost beyond the capabilities of an amateur to make. 2. The usual negative developer. 3. Citric acid may be used, but as a general rule we prefer acetic acid.

A Jersey Amateur.—You will not meet with much success in attempting to convert bad positive into negative collodion. In the Fothergill process you can meet with pretty good success by using almost any good collodion; but the best results are to be obtained by using collodion specially prepared for the process. We shall be glad to hear of the result of your experiment. We, however, doubt your success.

A Photo.—The best transparent glass stereograms which we have seen, are copied in the camera from large negatives as described at vol. 1. p. 22. We believe the process used is the albumen, or some modification. Very good prints of this kind may be taken by printing on a dry plate from a negative in a pressure frame. Try the collodio-albumen, or Fothergill's process, in this way, and exposing only a few seconds.

F. O. L.—Received with thanks.

F. Vincent.—1. A toning bath made by your formula will be ready for use six hours after mixing. 2. Good common water is what is always used for washing positive prints; but there is no doubt distilled would be better if it were used in sufficient quantity.

Dunedin.—1. We know no more of the process than appears in our columns; we should, however, advise you to try the collodio-albumen process. 2. It may be used repeatedly if poured back into the bottle after one batch is toned. 3. Yes, it is a good way to iodise the bath.

Quesitor.—Of course.

A Beginner.—The stereoscopic transparencies on ground glass are taken by printing the picture from a negative on a dry plate in the ordinary way, preparing the sensitive surface on the *ground* side of ground glass.

A Hard Working Amateur.—We know nothing more of the process than is given at vol. 1. p. 85.

W. Sturgeon.—You can remove the albumen from the surface of an albumenised paper print by boiling it in solution of caustic potassa, containing about 1 part potassa to 10 of water. The photograph will be uninjured, although slightly altered in colour.

A. Taylor.—Received.

S. Fry.—Received with thanks.

Erratum.—In the review of the stereogram of the moon given in our last number, the photographer's name was erroneously given, "Herbert Fry"—it should have been "Samuel Fry."

Communications declined with thanks:—X. P. Q.—A Soldier.—F. (Liverpool.)—Ellen M.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Mem.—Rev. O.—A. R.—Telemachus.—W. S. L.—Edinburgh.

In Type.—A Kerry Man.—E. S.—J. B.—H. S. I.—Hugh Robert Rump.—C. W.—J. C.—C. P. W.—Beta.—W. L.—R. P. H. N.—John Draffin.—T. Millard.—X. C. R.—Aliquis.—J. S. Ma[illegible]inn.—Viator.

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THE PHOTOGRAPHIC NEWS.

Vol. II., No. 35.—*May* 6, 1859.

A NEW COLLODION FOR FIELD WORK.*

BY J. E. MAYALL.

The prime requisites for a collodion for landscape photography are, that it shall be stable in its composition, not easily decomposed at the varying temperatures to which it is liable to be exposed, that it shall not become troubled by agitation, shall contain within itself the property of absorption of some of the moisture to which it is unavoidably subjected, and that the film when silvered shall have good keeping qualities—not liable soon to dry, to fog, to spot, to tear, to come off the glass; or to the thousand and one difficulties to which the landscape photographer is now exposed.

The bath, the developer, and indeed every part of the process, should be looked at from the point of view that the operator is in the country, far from the succouring aid of the chemist's shop, the advice of friends (which, by-the bye, is no great loss), the accidental obliviousness of some important article left behind in the last hurry of departure. I may remark that I have had these difficulties in view in perfecting the process which I have now the honour to read to this society.

First. The preparation of the pyroxyline—

Blotting paper	100 grains.

Mix—

Fuming nitrous acid, sp. gr. 1.450 ...	4 ounces.
Water	¼ ,,

Add—.

Sulphuric acid, sp. gr. 1.830	5 ,,

Cut the paper into strips, and slightly damp it with steam. Mix the nitrous acid and water, and then the sulphuric acid, in a bell glass. Put the paper into the acids with a glass rod, and cover up the vessel with a piece of flat glass. Let it stand in a basin of hot water till the temperature of the acids is 130° Fahr., for twenty minutes. Pour out the acids into another glass, and wash the paper as rapidly as possible, to get rid of the bulk of the acids, and allow it to stand under a running stream of water for six hours.

To the acid remaining from the above process, add 1 ounce of sulphuric acid, and then put into it, in small tufts at a time, 50 grains of clean cotton-wool; get up the temperature of the acids to 130° Fahr. again; soak half an hour; wash, as before directed for the paper, six hours in cold water, and dry at the ordinary temperature of the atmosphere; merely towards the last dry by gentle heat; when dry expose to the rays of the sun for half an hour. The increase in weight ought to be 50 per cent.

Remarks.—As it is difficult to obtain acids of the exact specific gravity above named, the operator must, for weaker nitrous acid, use a little more sulphuric in proportion. An excellent plan is to try three samples with varying quantities of sulphuric acid, until the exact proportions are found. Mr. Hardwich recommends 140° Fahr. as the temperature of the acids, but as he uses much more water and sulphuric acid in proportion to the *nitric* acid, it can do no harm; but I find on increasing the temperature beyond 130° Fahr., there is a loss of weight in the pyroxyline; also, it becomes powdery and not so good.

Rule.—The heavier the pyroxyline is from a given quantity of paper and cotton, the better is its quality.

Ether, pure or methylated, if well washed and not acid, I find equally good, sp. gr. 720.

Alcohol should be specially prepared for this purpose Ordinary alcohol, sp. gr. 820, should be well washed with dry carbonate of potassa and chloride of calcium for two days; say an ounce of each salt to one gallon of alcohol, to render it perfectly *anhydrous;* then distil over, out of doors, in a water bath; the chemists prepare this, and no one who has not had considerable experience in this operation ought to attempt it. The alcohol thus prepared is almost as explosive as gun cotton.

COLLODION.

Alcohol anhydrous	20 ounces.
Ether	10 ounces.
Iodide of magnesium	120 grains.
Bromide of ammonium	45 grains.
Chloroform	2 drachms.

Shake the chemicals well together, until the whole is dissolved; should the bromide of ammonium be difficult to dissolve, add a few drops at a time of ordinary alcohol to assist it, but not more: when perfectly dissolved, add 180 grains of pyroxyline from paper, and 60 grains of that from cotton. Agitate well, for two or three hours at intervals; try a plate; if the collodion is too thin, gradually add a little more pyroxyline, until you get the proper consistency. Here it is difficult to give the exact weight of the pyroxyline, for one kind is much more soluble than another, owing to some accidental circumstance in making it. This collodion will keep excited for two years without any perceptible change, either from varying temperature or from pouring and repouring in the usual way from a bottle.

The iodide of magnesia has properties eminently qualified for out-door work. Its easy solubility, particularly in the presence of a salt of ammonia, is well known to every chemist; and is, indeed, its chief characteristic to distinguish it from lime on the one hand, and strontia on the other; and, as it is such a powerful absorbent of moisture, it prevents decomposition of the excited collodion. The bromide of magnesium is even more deliquescent, and is an excellent excitant where extreme rapidity is not required, but not near so sensitive as the combination above given.

In order that the amateur and practical photographer may not be foiled in his attempt to put this process into practice, I now give another form that answers very well; my friend, Mr. Rosling, says better than anything he has tried.

Ether, sp. gr. .720	20 ounces.
Alcohol, sp. gr. .820	16 ,,
Iodide of magnesium	144 grains.
Bromide of magnesium	54 ,,
Chloroform	3 drachms.

Shake well, then add sufficient pyroxyline to render the collodion of moderate consistency, say 8 to 10 grains per ounce. Shake well, then add 4 drops of a saturated solution of iodine, 18 grains bromide of ammonium, or about 3 ounces of old excited ammonium collodion instead of the bromide of ammonium; shake well, and let stand 24 hours before using. Decant into 6-ounce bottles, and hermetically seal them ready for use.

I may remark in passing that the bromides are the true key to the middle tints. If you want excessive detail, as in leaves of trees and opaque objects, use more of the bromides; if you want intensity, use less.

SILVER BATH.

Nitrate of silver	50 grains.
Distilled water	1 ounce.
Iodide of magnesium	¼ grain.

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* Read at the Meeting of the Photographic Society, May 3, 1859.

Neutralise the solution of nitrate of silver with caustic potash; then for every ounce of bath with the ¼-grain iodide of magnesium, precipitate a small quantity of iodide of silver from the nitrate, well wash the precipitate before adding it to the bulk of the solution of silver, let it stand a few hours and filter; then for every 30 ounces of silver bath add 30 minims of glacial acetic acid, and 5 minims of nitric acid, so as to render the bath decidedly acid; this bath will keep for any length of time by now and then adding a crystal of nitrate of silver to dissolve the excess of iodide of silver which accumulates in the bath, and every few days add a few drops of glacial acetic acid. A good plan is to refresh the bath with a 60 grain solution of nitrate of silver, properly prepared according to the formula given, and refresh the bath every night after working. The gravity ought to be from 8 to 10 per cent.; if less than 8 per cent. the bath must be refreshed with additional nitrate of silver. Once a week expose the bath to the sun for half an hour. No other collodion must be used in this bath. As there is much alcohol in the collodion, the film requires to be well set before dipping it in the silver bath.

Developer.—2 ounces of iron tacks and 2 quarts of water put into a stone jar; to this add 2 ounces of sulphuric acid, and in 48 hours a solution of protosulphate of iron will be formed of about the strength required for a developer.

Of this solution take 10 ounces, to which add 2 ounces of common acetic acid (30 per cent. acid), one ounce of alcohol; one or two trials will show if the developer be strong enough; if the image of the camera comes out too quickly at spreading on the developer, reduce it with distilled water till the required strength of the developer is once obtained, and then observe it.

To refresh the iron jar again, add 2 quarts of water and 2 ounces of sulphuric acid; cover the solution with a lid to exclude the air, and it will be ready when wanted; it will keep better if 6 ounces of alcohol be added to every two quarts of iron solution, and bottled off and kept in the dark.

ANOTHER DEVELOPER.

Protosulphate of iron	2 ounces.
Distilled water	1 quart.
Alcohol	4 ounces.

Dissolve the iron and call this the stock solution. To every 10 ounces of protosulphate of iron solution add 2 ounces of common acetic acid (30 per cent. acid). A few drops of sulphuric added to the stock, will keep the developer clear from fogging. Always filter the solution just before using. As the whole of this process is exceedingly sensitive to light, the greatest care will be requisite to exclude the stray light both of the dark room, of the slides, and of the camera: wash the plates well before fixing.

FIXING SOLUTION.

Cyanide of potassium	12 ounces.
Water	2 grains.

either in a bath similar to the collodion bath, or by pouring on the plate separately.

Hyposulphite of soda is a good fixing agent, but I find the negatives fixed with hyposulphite of soda bleach afterwards unless they are uncommonly well washed.

The practical photographer will, at a glance, see the value of this process as a whole.

First, this collodion is not liable to decompose, it is always the same, it contains within itself a powerful corrective of moisture, and consequently of decomposition. The bath is not liable to fog, as it is always decidedly acid, and requires to be so; it also contains slight traces of nitrate of magnesia, which is a preservative agent, and enables the plates to be kept a long time moist.

The mixture of paper and cotton renders the film much tougher: it will resist any amount of washing.

Should there be any signs of reticulation of the film, it arises from the alcohol not being sufficiently rectified, and in that case, more ether will be required in proportion to remedy the defect. I have preferred to give the process just as I work it, no matter how it may jar with any theories or any other practice. My friends who have taken the trouble to work it, some of them in the tropics, others at the antipodes, and others again in the icy regions of Canada, all write of their success. And should the indomitable photographer of this country find in it a process that he can take up and leave off at pleasure without any of those mortifying failures which sometimes overtake the most persevering, I shall be amply repaid for the trouble I have taken in bringing it before the Society.

THE DIFFERENCE BETWEEN THE ACTIONS OF HEAT AND LIGHT ON SALTS OF SILVER.

BY MM. ED. BOUILHON AND E. SAUVAGE.

M. Niépce's experiments, which have attracted the attention of so many educated persons, have been taken up and continued in the laboratory of Baron Thenard.

Knowing the disputes to which this subject has given rise, we took extraordinary pains in repeating the experiments. The reductions obtained by means of insolated tubes by M. Niépce, ascribed by some exclusively to the action of heat, and by others to the action of light, are not due either to the one or the other, as we shall prove further on. As far as these differences of opinion are concerned there is not much occasion for surprise; they arise, we conceive, from incomplete researches, for analogous phenomena are produced under the separate action of each of the two agents, as was shown by M. Niépce in his last memoir on the action of heat.

When a tube containing a paper that has been saturated with nitrate of uranium, and insolated, is opened in a dark room, and its orifice applied to a piece of sensitised paper, after about twelve hours a very sensible reduction is observable on the part corresponding to the opening. If a few drops of distilled water be previously dropped into the tube the reduction is more rapid, and if the temperature be carried up to about 176° the same result will be produced in from ten to twelve minutes. If the tube be heated without the addition of moisture, the action is more rapid than when cold, but less so than when water has been inserted.

On the other hand, if a piece of sensitised paper be exposed to the direct action of the vapour of distilled water, the reduction is effected in from fifteen to twenty minutes.

The photographic positive papers, which contain an excess of nitrate of silver, give the same results.

What conclusion are we to derive from these facts? That there is, as in the first experiment, an action which is accelerated by the vapour of water; and, as in the second, that the vapour of water alone may give the same reductions.

It was when we had arrived at this point, that the idea of submitting to the action of the insolated tubes, papers impregnated with salts incapable of being reduced by heat in presence of organic matter, led us to make the following experiments:—

If we put a pure chloride of silver paper under an insolated tube, we obtain in twelve hours a very strong reduction. The same results are obtained if we employed pure iodide of silver or bichromate of potash.

Although these experiments may be considered very clear and conclusive, we desired to corroborate all the facts obtained, as much for the purpose of sheltering ourselves from criticism, as for our own entire satisfaction; and this is the plan we adopted. We washed five papers in distilled water, and afterwards impregnated the first with nitrate of silver; the second, with chloride and nitrate of silver; the third, with pure chloride of silver; the fourth, with pure iodide of silver; and the fifth, with bichromate of potash. The whole of them were then placed on a copper plate heated on a water bath. After ten minutes, two papers only gave signs of being acted upon: that prepared with nitrate of silver, and that prepared with chloride and nitrate. The others were heated for upwards of an hour, but gave no trace of reduction.

In considering this last series of experiments, we see that the action produced by the insolated tubes on the sensitised papers is in no way due to heat.

Now, is it due to the action of light that we may believe to be stored up in the paper? No; because if we interpose a very thin plate of glass between the tubes and the sensitised paper, no reduction is obtained even after four days' contact.

To sum up: the reduction of a sensitised paper submitted to the action of an insolated tube is not due either to the action of heat or to the stored-up light, but to a peculiar volatile substance formed when certain salts and certain acids are submitted to the action of light in the presence of an organic matter.

Judging from special researches commenced some time since, we believe we are in a position to announce that this body, or this powerful reducing agent, will shortly be known, at least in its properties.

THE COMPARATIVE TRIALS OF PHOTOGRAPHIC LENSES.

BY T. GRUBB, M.R.I.A.

The observations in my letter of 13th ultimo (published in your number of the 21st April) were confined to that portion of the late examination of the Petzval and Voigtlander lenses, which affected these when arranged as *portrait combinations*. It remains to offer a few remarks on the trial of the same lenses arranged as *view*, or orthoscopic, combinations.

Here, as in the former case, the data recorded (or, at least, published) are not as full as could be desired. The focus of each lens is stated as being "about" 30 inches, and the apertures used the "full," but whether the latter were equal, or nearly so, is not mentioned; the distance (from the lenses) of the objects 88 inches; and the objects appear to have been two similar paragraphs cut out from newspapers, and placed 15 inches apart. One camera only being used, and the lenses attached to it, each one in succession for trial.

The most obscure part of this account is that relating to the objects, or rather the manner in which they were used for ascertaining the relative degrees of perfection of the lenses at different portions of the field. The most likely conjecture is, that the camera was placed directly opposite one of the paragraphs; the image of the second being used for comparison of the lateral pencils of the lenses. In such case it would be desirable to have a third paragraph, the lens being placed directly opposite the central object. Supposing, now, that three such paragraphs were used and placed on the screen, at the distance of 15 inches each, the entire distance would be but 30 inches, and the lenses being placed at 88 inches from the objects, the angular field, included by the camera, would evidently be that which a linear dimension of 30 inches includes at a distance of 88 inches. This is just 20 degrees, being only one half of that which a good new lens should bear with adequate distances; it is, in short, equivalent to a field of only five inches linear, for a focus of 15 inches, and quite insufficient for testing the performance of a lens in respect of its capabilities for affording that extent of field, with adequate distances, now sought for by photographers. I conclude, therefore, that some other means than that indicated in the account given was resorted to for ascertaining the relative distinctions of the lateral pencils of the lenses indicated.

The same indiscretion with respect to distance of the lens from the objects, which I adverted to as occurring in the trials of the portrait lenses, have also occurred in the trials of the view combinations. A lens of 30 inches principal focus, placed at 88 inches from an object, will have the focus for that object lengthened out to more than one half additional, say 45 inches instead of 30 inches. The angular aperture (of the lens to the image) will be reduced to $\frac{2}{3}$rds, and the intensity of the image to $\frac{4}{9}$ths. Under such circumstances the conditions present differ so far from those occurring in ordinary practice, that the experiments are at best fitted for comparative estimation, and that only for the actual lenses under trial. It is right that I should admit here, that the trials were avowedly only intended as such, and I trust it will be understood that my criticism on them has been communicated not as finding fault with the trials themselves, but rather as suggestive of future trials being so conducted as to prove more generally useful, by making the conditions (as nearly as can be done with convenience) similar to those occurring under ordinary practice, and by communicating a more ample record of these, and of the results.

Dublin, May 4, 1859.

THE ALBUMEN PROCESS.*

BY P. C. DUCHOCHOIS.

Many substances have been proposed to destroy the tenacity of coagulated albumen, and to render it more favourable to photographic preparations, by giving it greater sensitiveness. But nearly all such substances, besides their solubility, which admits of their employment only in very small quantities, have their peculiar inconvenience; thus, dextrine, or soluble starch, tends to render the albumen film more subject to scale or split; honey keeps it in too damp a state, and sugars very easily establish the fermentation of albumen, and thus prevent its solution being kept. I thought that the substance the best suited for albumen preparations would certainly be that which possessed the following properties:—

1st. To become insoluble when in contact with diluted acids.

2nd. To prevent, like sugars, the crystallisation of the alkaline, iodide, and bromide, by maintaining the layer of albumen in an incomplete state of desiccation.

3rd. To add to its sensitiveness, by its tendency to reduce the silver salts.

Such is *glycyrrhizine;* and experience having confirmed me in all that I had expected of its union with albumen, I present you with the following as one of the quickest, giving very fine and harmonious proofs:—

Albumen—

White of egg	1 ounce.
Solution of glycyrrhizine	3 drachms.
Iodide of ammonium	6 grains.
Bromide of ammonium	4 ,,
Iodine	1 ,,

Dissolve the iodide and bromide in the glycyrrhizine, add the iodine and white of egg, heat till a thick froth is obtained, and let settle.

The glass is coated with this albumen according to the ordinary process, or spread on a sensitive collodion film as in the Taupenöt process, when, of course, the sensitiveness is still greater.

Silver bath—

Water	1 ounce.
Nitrate of silver	40 grains.
Iodide of ammonium	½ ,,
Acetic acid	40 minims.

Developer—

Water	1 ounce.
Strong alcohol	½ drachm.
Gallic acid	to saturation.
Acetic acid	5 minims.

Before using this solution, add a few drops of a 20 grain nitrate of silver solution, and 2 or 3 minims of a 25 grain solution of acetate of lead.

Solution of Glycyrrhizine.—To make this, boil for several hours 1 pound of liquorice roots in 25 ounces of serum of milk; filter, and evaporate the solution to 10 ounces. It would, without doubt, be better to prepare pure glycyrrhizine, but the above solution answers well the purpose.

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* Read at the Inaugural Meeting of the American Photographic Society.

Critical Notices.

Photographs taken at the Cape of Good Hope. By Mr. John Simpson. London: Bland and Co.

The collection of views before us are taken from wax paper negatives, and, when we consider the fact that they are among some of the earliest attempts at photography in that far distant colony, and take into account the difficulties which amateurs must necessarily have to contend with, we must express our admiration at the results of Mr. Simpson's efforts. Photographers who reside in and near London, in these days of fast travelling, can ill judge of the almost insurmountable obstacles which must constantly be presenting themselves to the colonial photographic amateur. Imagine, for a moment, an operator being three months without hypo.! After having duly exercised that virtue which it is said is rarely found in the female portion of society, and never (?) in the male portion—patience, imagine him again having to pay an exorbitantly high price for it when procurable. These are among some of the trifles which are likely to damp the ardour of an enthusiastic photographer. Judging from the Indian views by Dr. Murray and Mr. Hamilton Clarke, which were exhibited in the Society's last two exhibitions, we have no hesitation in pronouncing Mr. Simpson's, in many respects, far superior. They are clearer in tone, and give much greater detail. Indeed, so fine is this feature in some instances, that we have often seen collodion pictures far inferior. Of course, there is apparent in the views before us, the fact that they were taken in rather a strong light, a great intensity of black and white occasionally occurring. The architectural views are very good indeed; and the selection of the sites often evince great artistic taste. From the landscapes it would be unfair to expect much, seeing that definite detail in the distant perspective is, generally speaking, almost impossible in paper negatives. Such a series of photographs as these would prove an interesting feature in a photographic exhibition, considering that there now seems to be such a rage for anything "South African," in spite of the warning picture constantly before the eyes of metropolitan omnibus travellers, depicting the agonised faces of three individuals who were induced to taste "South African," (popularly believed to be a votive offering from the survivor in order to save others from so dreadful a fate).

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

Progressing with the Picture.—During the progress of the head, it will be necessary to proceed also with the drapery, &c. The consequence of completing any one part before a general impression of what the picture is intended to be has been produced, is to disappoint the eye by making it appear more finished before the back-ground and draperies are painted than after. Then, first complete your background, next your draperies, and, lastly the head.

Do not materially alter the tone of any part, especially the background; for supposing it were made much darker than the shadows of the face justify, this would entail the necessity of making your head deeper also, or it would look flat and unfinished.

Finish.—We shall now make such suggestions as may be calculated to complete a portrait which has gone through the preceding stages.

A little Chinese white mixed with lake, and worked in a few places over the cheeks, will give much sweetness to the colour—that healthy red found upon peaches. A few touches of the same, rather paler, upon the lips and ears in a few places. In very deep ruddy faces, burnt sienna and lake with white, or red chrome, vermilion and white, or red chrome and vermilion alone, may be used for the same purpose. On the forehead of a very fair face, a little pure white may be thinly touched on in the high lights, &c.

Touch in, with gum and lamp-black, the black pupil in centre of iris; afterwards, with Chinese white, the bright point. Then, with lake and ivory black, touch in lines faintly to define the eyelids and shadows of eyebrows, line between lips (faintly), locks of hair over face, if any, &c. Any shadows cast by locks of hair, &c., upon the forehead or cheeks, may be coloured warmly with a colour made of vermilion and madder brown, edged into the light flesh with a blue or purply-grey. See Lawrence's heads for this.

For the deepest shadows throughout the head, use madder-brown, which, worked over the *previously light warm* colour, will give a good effect.

Where a little purer blue is required, or any pearly tint wants sweetening, use a little white mixed in the colour, and, with medium, touch delicately upon the part; this will produce any delicacy of tint.

Light and Shade.—It is difficult to understand *why* things appear as they do, and are what they are. We often, on seeing a picture, exclaim—"How very good!" "What fine relief!" "How true to nature it seems!" yet seldom stay to discover how or why it is so. No one can represent well that of which he does not thoroughly comprehend the meaning.

The cause of some really good photographs representing life so well is, that in them the effect is produced by similar means as in the *real object*. Now an object is made to appear relieved much from this cause; the lights and shadows in the front are in stronger contrast than in those parts which recede, the outline is bolder and more telling, whilst those parts that retire are softer, neither lights nor shades so strong, while the extreme edges are so soft, as at an ordinary distance to be not plainly traceable. Hence not making much impression upon the eye, those parts recede back; and at the same time, owing to the fact that those parts which do come out, make a strong impression upon the eye, they appear to stand in relief. It cannot be occasioned by the same sensation of touch, as in the case of blind people, who receive impressions of things by the feeling of touch, that we know a thing to be round; because we feel confident that certain things we see are round, without approaching to touch them. So in a sharp photograph, which is really flat, the effect is that of relief, because the lights and shades are graduated just as in the life.

It is the more necessary to speak of this, as ignorance of such things is the cause why many make such flat, hard pictures. They make the outside lines too palpable, and do not keep up sufficient force in the front parts of objects, destroying all the charm and appearance of reality, which proves plainly they do not understand what they are doing.

It will also be observed there is a reflected light softening all the sides and edges of objects in shadow. This reflected light will be found under all circumstances to soften those lines, which, being shadow, would cut hard and black against anything light behind, if it were omitted in a picture, also materially conducing to the soft impression, which, in nature, pervades all things. Unskilful painters have sometimes the shadows down one side of the face, or a coat cutting hard against a background, thereby breaking up all appearance of relief and softness.

Further, there is a principle called "keeping," which means, the just balancing of all the lights and shadows throughout a picture or in a face, so that they do not anywhere seem to startle us. If one part be made too dark for the others, *i.e.*, darker than necessary to make out the form of whatever it is upon, that will at once throw all the rest of the shades, &c. out of use, and itself appear dirty.

A most perfect picture may be destroyed by introducing three or four harsh touches about any feature; or by making the light, or certain portions of a face too bright.

It will appear from this how much attention to light and shade is necessary to preserve fidelity of likeness; for a photograph is no other than a mass of delicately graduated lights and shadows. Then, by the better understanding what produces these lights and shadows, it will appear what consequences may be expected to result from a deviation from any of them.

(*To be continued.*)

Dictionary of Photography.

Chloride of Sodium.—This important photographic salt is formed of equal equivalents of chlorine and sodium. It is commonly spoken of as *salt*, although, as we have before explained, this term is now applied to the whole series of such compounds of electro-negative with electro-positive bodies. It is extracted from sea water by evaporation, and then is known as marine salt. It also occurs as a mineral in the earth, whence it is dug up, and goes by the name of rock salt. As marine salt frequently contains impurities, and clear colourless fragments of rock salt are to be easily obtained at a trifling expense, it will always be better to employ the latter form of chloride of sodium in all photographic experiments, as then its purity can be relied on. It is largely used for the preparation of positive paper; it may also be used instead of bromide of potassium for temporarily fixing negative pictures, and it is also of great use in precipitating silver residues to the state of chloride of silver, which may afterwards be reduced to the metallic state by any of the methods previously described in our articles on the reduction of silver residues.

Chloride of Strontium.—This is a whole crystalline salt, composed of equal equivalents of chlorine and strontium, which, from its solubility in alcohol and ether, we have frequently employed for the purpose of adding to collodion, with the object of experimenting on the effects produced in the sensitive film by the entire or partial substitution of chlorine for iodine or bromine.

Chloride of Zinc.—A salt composed of equal equivalents of chlorine and zinc. It may be made by dissolving zinc in hydrochloric acid, and evaporating the solution to dryness. It is one of the most powerful attractors of water known, and is, on this account, used in cases where the affinity of chloride of calcium for water is not strong enough. Chloride of zinc in solution forms a very useful *soldering fluid*, and in this state a bottle of it will always be found valuable in the laboratory.

Chloroform.—This is a heavy volatile fluid composed of chlorine, hydrogen, and carbon; its formula being $C_2 H Cl_3$. It is obtained by distilling chloride of lime and dilute spirits of wine. It possesses a powerful ethereal odour, and well-known anæsthetic properties. It is as a solvent, however, that it is best known to photographers, being one of the best solvents for many of the gums, caoutchouc, and gutta percha. It has been (and will, doubtless, be more) applied to the manufacture of rapidly drying varnishes for collodion pictures, to which its comparatively low price and powerful solvent properties make it eminently fit. Mr. Shadbolt has also used and recommended it to be added to collodion in the proportion of a few drops to each ounce, for the purpose of destroying the reticulated appearance due to the employment of inferior pyroxyline or dilute alcohol.

Chromic Acid.—This acid is composed of one equivalent of the metal chromium and three of oxygen; in symbols, $Cr O_3$. It may be very readily prepared by decomposing chromade of baryta with dilute sulphuric acid, adding the acid in only just sufficient quantity to precipitate the baryta. It forms blood-red crystalline needles, which are soluble in water, but are decomposed on contact with any organic substance, such as filtering paper, the skin, &c. Chromic acid unites with bases, and forms a well-marked series of chromates. These salts are characterised by their yellow or red colour.

Chromate of Lead.—A beautiful yellow precipitate formed when a soluble chromate and a soluble lead salt are mixed together. It is largely used in painting.

Chromate of Copper.—Prepared by precipitating a salt of copper with chromate of potassa, or by dissolving hydrated oxide of copper in chromic acid. Caustic ammonia dissolves this salt, forming a beautiful dark green liquid, from which, by the addition of spirits of wine, ammonio-chromate of copper is precipitated in the form of a dark green powder. This salt was first applied to photographic purposes by Mr. Hunt, who employed it in the *chromatype* process.

Chromate of Potassa.—A salt composed of equal equivalents of chromic acid and potassa; it is a yellow crystalline compound, soluble in water, and only of interest to the photographer as serving to precipitate the various metallic chromates.

(*To be continued.*)

A Catechism of Photography.

ON THE CHANGES WHICH TAKE PLACE IN POSITIVE PROOFS—(*continued*).

Q. What was the result of these experiments in fixing photographic proofs?

A. In the first place fixing and toning, which are too frequently regarded as a single process, was separated into two operations.

Q. What method was suggested as the best for fixing?

A. First of all to remove from the proof all useless materials; these are—an excess of nitrate of silver, the soluble salts contained in the silver bath, such as alkalines, &c., and the chloride of silver not affected by the light.

Q. How is this operation effected?

A. Nitrate of silver and alkaline salts are soluble in water, the proof is therefore washed twice in a basin of common water. This washing in two waters presents, as we have seen, numerous advantages; first, it permits the collection of the largest part of nitrate of silver which has been decomposed by the preceding operation; it facilitates the immersion in the fixing bath, as without it the proof is more likely to be affected by air bubbles; and, finally, its chief advantage is that it betrays the reaction of the nitrate of silver upon the hyposulphite of soda.

Q. What is done with the proof after these preliminary washings?

A. After being thoroughly washed it is necessary to remove the chloride of silver which still remains in the proof. The agents generally employed are hyposulphite of soda and ammonia. Both of these are successful, but the hyposulphite of soda is usually preferred. A few minutes will suffice to fix the proof, which must then be washed again and again, until it is made perfectly free from any extraneous matter.

Q. How is the second operation performed?

A. After fixing, it is important to modify the disagreeable reddish tone of the proof. The methods of imparting tints are as numerous as the tints are varied. The conductors of the experiments that have been detailed, did not especially direct their attention to these different methods of tinting, leaving these to the taste and experience of the operator. They, however, recommended the use of the sel d'or, as it agreeably modified the tint and imparted solidity to the image.

Q. What conclusions were arrived at by the result of these experiments?

A. The conclusions arrived at were:—

1. That the positive photographic image, in the ordinary process by chloride of silver, formed by pure silver.

2. That new and pure hyposulphite of soda, properly used, does not leave any appreciable traces of sulphur, after thoroughly washing the proof.

3. That the cause of the darkening and discoloration of proofs is the sulphuration of silver; all the discolorations, directly or indirectly, being traceable to the same cause.

4. That the fixing should always be conducted separately

from the tinting. That in fixing all matter should be carefully removed which does not assist in the formation of the picture. That in toning the use of sel d'or is to be recommended.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 3, 1859.

We will now resume our remarks on the Exhibition of Photographs at the *Palais de l'Industrie*. A great many proofs that were sent to be exhibited were refused by the committee: and all have been submitted to the examination of a special jury, composed of members of the *Société Française*. Since our last visit some photographs by Mr. F. H. Morgan, of Bristol, have been hung up. This gentleman's name is not down in the catalogue: by some inconceivable error on the part of his French correspondent. Mr. Morgan's proofs have only just arrived. "Better late than never," for this artist's trees do him much credit, and have been admired by his brother photographers on the Continent. They are remarkable principally for their boldness, the minuteness of detail, and the modelé, which is generally very good. Mr. Morgan's subjects are well chosen, and may rank among the best landscapes in the exhibition. They are small proofs from collodion negatives.

The Comte Aguado, member of the French Photographic Society, has exhibited similar photographs: his "Paysage et Etudes d'Arbres," on waxed paper, and, better still, his "Etudes d'Arbres d'après Nature," taken on wet collodion, deserve especial mention. The trunks of the large oak trees come out well with all their details, and these proofs have a reddish-brown tint that makes them agreeable to look at.

Viscount Aguado, another member of the French *Société*, has exhibited some very good photographs also. One of the best is his well-known reproduction of a drawing from the beautiful picture by Winterhalter, representing the Empress of the French surrounded by her maids of honour.

M. Naya, of Venice, has enriched this exhibition with some most beautiful photographs. In all, eleven proofs, of which eight are Italian views, and three, reproductions of engravings from works by Titian and Paul Veronese. The "Bridge of the Rialto," and the "Bridge of Sighs" (Venice), are, perhaps, the most perfect photographs in this artist's collection. Venice, as our readers know, is built upon 72 little islands, possesses more than 300 bridges, of one description or another. Of these the most beautiful are, doubtless, the "Rialto" and the "Bridge of Sighs." They form splendid subjects for the photographer, and we may add, the brilliancy of an Italian sun shines out in M. Naya's proofs. The "Rialto" was commenced in the year 1588, by the great Michael Angelo, and finished in 1594. It consists of one flat and bold arch of nearly 100 feet span, and only 23 feet above the water. This gives it a peculiarly striking aspect, and a stranger on arriving at Venice would immediately recognise the "Rialto," which, in Shakespeare's time, was considered the most beautiful bridge in the world. The whole exterior of the bridge, as well as that of the shops built on it, is of marble. Another beautiful photograph by M. Naya is a representation of the "Principal Gate of St. Marc," and we should mention likewise his "Basilic of St. Marc." The other proofs exhibited by this artist are very fine, but rather too dark to please us.

Another important *desideratum* for photographers struck us to-day. In most of the proofs in this exhibition where *water* is represented, it has spoiled the effect of the whole. The water that flows under M. Naya's "Bridge of Sighs" has succeeded tolerably well; but, after all, it is *not* water: is it something flat, smooth, still, brilliant, or velvety, resembling rather a sheet of polished metal or a board of varnished mahogany; but it is not *water*. We believe this bad effect is generally to be attributed to over-exposure. If the watery parts of a landscape, for instance, could only be submitted to a shorter exposure than the *terra-firma*, trees, figures, &c., we think, *à priori*, that better results would be obtained. We all remember how difficult it was at first to produce good clouds and skies: but the difficulty was conquered more than two years ago in England, and has been since overcome on the Continent.* The skies of M. Warnod, for instance, of whom we shall have occasion to speak presently, are very perfect representations of nature, in comparison to what that photographer would have produced some little time back. We wish we could say the same for *water*. One exhibitor has, however, "hit the nail upon the head." We mean M. Gaillard, of Paris (member of the Society). He has exhibited a landscape—a positive on glass, which is seen by transparency. Here *is* water!—real water, and no mistake about it: but the tree-stems are transparent too!!

The reflection of objects in the water adds much to the transparency of the latter in a picture. How is it, then, that photographers do not avail themselves more of this circumstance?

We mentioned, just now, the name of M. Warnod (of Hâvre). This artist has exhibited a considerable number of portraits. We do not think we could point out a bad one among them. They are mostly remarkable for what the French call *modelé*—good tone, softness, and *relief*. His marine views, taken at Hâvre, deserve notice on account of the perfect manner in which the clouds have been obtained; but, on the other hand, objects such as ships, figures, piers, &c., are over-developed in more than one proof.

Messrs. Pesme and Varin, who exhibited many excellent productions at the Brussels Photographic Exhibition in 1857, have sent to this collection some very good portraits—of the very kind which, of all others, we should prefer for the walls of our drawing-room. The back-ground is light: a slight shade only surrounds the figures, and aids in giving them the necessary *relief*. Seen from a little distance, these proofs resemble fine pencil drawings rather than photographs.

M. Pesme did not think, perhaps, that the same humble critic who admired his photographs at Brussels in 1857, would be on his track again at Paris in 1859! We recognise in his proofs some of our old Brussels friends—but they are aged! they are fast fading away. They pleased us at Brussels, and we spoke well of them on account of their lightness; they are rather *too* light here, and we fear that if ten years instead of two had elapsed since we first saw them, they would have disappeared altogether! We hope M. Pesme will take the hint. He has hit upon a method of obtaining artistic photographs that please everybody; but if he is not stopped in time, he will go to extremes and produce a quantity of pale-faced images that will cause a very contrary effect.

M. Silvy, member of the French Photographic Society, has exhibited a frightful-looking object—a portrait of the King of Sardinia. The next panel ought (according to the catalogue) to have contained a portrait of the Queen of Sardinia (which we should have looked at with more pleasure); but, probably terrified by the awful appearance of her husband, she has fled, and the panel is empty. On the other hand, M. Silvy's portrait of himself is one of the best photographs in the exhibition. It is a three-quarter portrait: he is standing in an easy position; he has a thick stick in one hand, and conceals the other in the pocket of a loose coat, the folds of which are admirably rendered. M. Silvy has exhibited a number of other proofs, which are not bad, but do not entitle him to a more special notice here.

We ought also to mention M. Le Gray's portraits, which have attracted considerable attention, in most cases very deservedly. His photographs are remarkable for their *modelé*, roundness, and softness. He has also sent a view of the French camp at Chalons—a large photograph composed of six proofs—and some other works, among which a view of Paris from the *Pont Royal.*

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* According to a letter that has been placed in our hands this morning it would appear that M. Warnod had succeeded, as early as 1856, in producing clouds and other objects in motion.

M. Fierlants, of Brussels, has exhibited no less than 68 different proofs, most of which are copies of pictures and drawings of the fifteenth century from the schools of Bruges, Brussels, Antwerp, and Louvain. All these have been photographed on wet collodion, except the copies of drawings and engravings, which were made on albumenised collodion. The reproduction of some of the larger pictures was obtained with an objective, manufactured by MM. Voigtlander, called an "orthoscopic objective," and having a focal distance = 1 metre 45 centimètres.

We shall continue, in our future letters, our critique of this splendid exhibition; but we must call the attention of our readers once for all to the following observations. It is impossible, with our limited space and time, to speak of everything at once. We would beg of them also not to imagine that the productions of one photographer are in our judgment superior or inferior to those of another, because his name comes foremost or latest in our notice. We have not thought proper to confine ourselves by any method which would have compelled us to take every photographic artist in his turn according to his merit—a thing which in the present collection at the *Palais de l'Industrie*, would have been as impossible as to have written them down alphabetically, as the catalogue has done. It remains yet for us to notice some of the most remarkable photographic productions in this truly wonderful exhibition.

M. Bertsch gives us the following description of a new process for engraving photographically, suggested by M. Berschtold. A glass is covered with a thin layer of any opaque substance; on this is traced, with a pointed instrument, a number of fine parallel lines, very close one to another. When the piece of steel to be engraved has been covered with bitumen, and exposed in the camera (as in the process now in use) before submitting it to any solvents, the negative is taken away and replaced by the streaked glass. Wherever the bitumen has been rendered insoluble by the action of light, no further change is observed to take place. The stripes of the glass are represented, however, with an intensity depending upon the degree of insolation undergone by the bitumen. This intensity increases according as the different parts of the bitumen have been less insolated.

The striped glass is then turned so that its lines may run in a direction perpendicular to the first, and a new insolation ensues, but the latter is only of half as long duration as the preceding one. This same operation is repeated over and over again, the lines on the glass being placed in a *diagonal* direction, then in an intermediate position, and so on until a fine *grain* has been produced.

In those places where the action of light upon the bitumen was complete in the first instance, *i.e.*, in the *lights*, no streaks are produced, however often the successive insolations have been repeated; but, on the other hand, these streaks are photographed on the parts which constitute the half-tints and the shades, in a proportion which coincides exactly with the quantities of ink these several parts should receive. Thus, for instance, the darkest shades obtain the maximum quantity of streaks, *i.e.*, the entire quantity of streaks produced by the successive insolations; and whilst the lights which have received no streaks at all remain pure, these dark parts will give an intense black.

"This new process will, doubtless," says M. Bertsch, "give far better results than the old method, which consists in covering the bitumen (which has been insolated, and then treated with an appropriate solvent) with a fine powder of resin to cause the production of a *grain* and to make the ink adhere better, and lastly by eating away by an acid, &c. For, in this manner of operating, the resin that has adhered to the light portions must be removed by the artist. Often, again, the resin which remains has to be covered with a varnish. Now all this requires skill. M. Bertschtold has endeavoured, in his process, to render skill almost unnecessary, and to let light act by itself and do all the work."

M. Nachet, of Paris, has lately constructed a new kind of microscope for photographic objects (*mikro-photographes*). It is a simple lens for producing very small photographs of large objects. In fact, it may be termed a kind of microscope destined to render exterior objects much smaller than nature, instead of magnifying them. The photographs produced by the aid of this instrument can only be seen with the aid of a proper microscope.

A slight error has slipped into our last communication. The quantity of platinum fused at once by MM. Deville and Debray was rather more than 23lbs., and not 23,000lbs. The crucibles M. Deville employs in his metallurgical operations are made of lime or of carbon. In the latter case, it is the carbon obtained from the gas manufacturies, and which is also used in the construction of Bunsen's pile. As M. Deville's memoir is not yet published, we have not been able to enter into more details concerning his analysis of platinum ore.

Tungsten is a metal which has been hitherto little studied in a practical point of view. It appears, however, destined to operate a complete revolution in the manufacture of steel. It has been lately discovered that an alloy formed of 80 per cent. steel, and 20 per cent. of tungsten, possesses a degree of hardness which has never been obtained in the manufacture of steel. This alloy works upon the latter with incredible facility, and can even cut it. Experiments have been made with this new composition at Vienna, at Dresden, and at Neustadt, Ebertswalde, and considerable quantities of the alloy in question are, it is affirmed, being manufactured in that part of the world. Many old tin mines have been bought up with a view of extracting tungsten ore, and considerable prices have been paid for some that have not been worked for a long time.

PEOPLE IN THE MOON.

To the Editor of the "Photographic News."

Dear Sir,—It must, I am sure, be a source of great gratification to your numerous readers to find that "Mr. Barkas" is willing to show us so much more than anybody has yet seen of the surface of the moon.

Perhaps I may be permitted to draw the attention of that gentleman to a circumstance which appears to have misled him in his calculations. The highest power that can be applied with advantage to lunar observations is about 240, so that in representing the observer to have a power of 1,000 at his command, a very grave error is committed.

With regard to the *rat* Mr. Barkas so obligingly offers to exhibit, I confess that my own impression is, that on attempting the operation, the only result from the lunar "*mons*" would be a "*ridiculus mus.*"

In conclusion, allow me to place at Mr. Barkas's disposal any number of transparencies of the moon he may wish; and should he obtain anything at all approaching the result he so confidently asserts, no one will be more gratified than myself.—Yours truly, Samuel Fry.

79, *King's Road, Brighton, April* 25, 1859.

Photographic Societies.

London Photographic Society.—R. Fenton, Esq., in the Chair.

After the minutes of the proceedings at the last meeting had been duly read, Mr. Malone rose to ask a question relative to the suggestion he made on that occasion, that certain chemists should be added to the Committee appointed to test the relative merits of different kinds of collodion; in reply to which, he was informed, that Mr. Spiller had been summoned, but had written to say that he had not time to attend; and Mr. Heisch had written to the Secretary that he had neither "the time nor the inclination to do so," and, moreover, he considered, that a great liberty had been taken in proposing his name without his consent. A reply with which Mr. Malone expressed himself satisfied, though what satisfaction he could derive from such a reply was not very easy to discover.

Mr. Mayall then rose to read a paper on the subject of the collodion used by him. It was of considerable length, and full of such minute detail, that it is almost impossible to give an analysis of it. We have, therefore, thought it best to lay the paper itself in an unabridged form before our readers. This, through the courtesy of Mr. Mayall, we are enabled to do in the present number (vide p. 97).

The Chairman invited Mr. Hardwich to express an opinion on this paper.

Mr. Hardwich was not prepared to express an opinion on the paper he had just heard read, but proceeded to give one notwithstanding. He took an objection at the outset to the use of paper as a substitute for cotton in the manufacture of pyroxyline, on the ground of the paper being liable to be contaminated by the admixture of different foreign substances. He thought that the quality of the collodion depended chiefly on the pyroxyline, and that in order to produce a perfect collodion it was advisable to direct attention mainly to the finding of an uniformly good and pure gun-cotton. As regarded the iodide of magnesium, he did not think Mr. Mayall interpreted its effects rightly; besides which, he thought it would be difficult to obtain it in commerce in a state of sufficient purity, whereas iodide of potassium could be readily purchased in that condition, and gave results which he considered fully equal. The plan he would recommend travelling photographers to adopt with respect to their collodion, would be to carry the plain collodion in one bottle, and two iodisers separate—one containing an iodide and the other a bromide, and so iodise the collodion in small quantities as required. He described an experiment he had made with iodide of magnesium, in which he had failed.

Mr. Davis rose to call the attention of the society to what he considered a curious fact he had recently met with relative to collodion. He had made some, in which he had used iodide of potassium and iodide of cadmium. On the addition of the iodiser it had assumed a yellowish colour, as usual, which gradually deepened to a red; but ultimately cleared itself, and became colourless. He attributed this to the iodide of potassium being of an alkaline nature, and the iodide of cadmium acid, and to a consequent reaction of some kind. He went on to remark on the difficulty there was in getting nitric acid of a certain strength, &c.

Mr. Williams next offered some observations, in reply to Mr. Hardwich's remarks, on the difficulty of manufacturing iodiode of magnesium of sufficient purity to be available for photographic purposes. He stated that he had met with no such difficulty; and, as an illustration of this, Mr. Mayall handed two bottles about the room containing, respectively, iodide and bromide of magnesium, which Mr. Williams had prepared for him. Mr. Williams did not say that he shared Mr. Mayall's opinion, as to the effect of the iodide or bromide of magnesium in the collodion. He concluded by stating a fact which excited considerable sensation among the members present. He had had forwarded to him, by a manufacturer of collodion, twenty Winchester quarts of collodion residues, for the purpose of recovering the ether, which he effected by the ordinary process of distillation; after which he continued his operations for the purpose of recovering the iodine. When he had terminated his labours he found, to his great surprise, that the residium contained a sufficient quantity of oxalic acid to yield him no less than one pound five ounces of oxalate of lime. Mr. Williams (though an exceedingly skilful chemist) could not at present explain where this oxalic acid came from, but contented himself with announcing the fact to the society.

Mr. Hardwich suggested various methods of explaining the phenomenon, all of which were disposed of by Mr. Williams, and the conclusion arrived at, if conclusion it could be called under the circumstances, was that it was a very extraordinary phenomenon, but that at present it was inexplicable. It was generally agreed, however, that this might account for some of the difficulties which photographers met with in the practice of their art.

Mr. Malone differed entirely from Mr. Mayall as to the superiority of paper over cotton wool in the preparation of pyroxyline. He had himself visited at a paper-mill for a fortnight, and knew all about the process, and he could positively say that no two specimens of paper were likely to be identical in their constituent parts. Paper was a most indefinite compound, and therefore a very unfit substance to be used in the manufacture of collodion. Cotton-wool gave results which were not always identical, but, at all events, it was a much nearer approach to a definite chemical compound than could be obtained by the use of paper; and he agreed with Mr. Hardwich that improvements in collodion were more likely to be effected through the pyroxyline than from any other means. He ridiculed the idea of iodide of magnesium acting as a preservative of the collodion from decomposition, by absorbing the water therein, and pointed out sundry strong reasons why such a collodion as that proposed by Mr. Mayall *could not* be a good one.

Mr. Shadbolt said that Mr. Mayall, in referring to him, had mistaken the smile of approval on his face for one of derision. He did not intend to criticise the formula given by that gentleman for making collodion; but he could not help observing that the developer which he directed to be used with it (a decoction of iron nails with an admixture of sulphuric acid) was the same as that suggested by M. Martens, of Paris, more than two years ago.

Mr. Mayall then rose to reply to the objections which had been urged against his formula. His horror of mixtures was as great as ever it was, but he must deny that his collodion was a complicated mixture; on the contrary, its manufacture was characterised by great simplicity. He asserted that paper, such paper as he used (Whatman's blotting-paper), was always the same; that he had used it for years, and had found no difference in the quality of the pyroxyline obtained from it. He dwelt at some length on the effect of various iodides and bromides in collodion, and persisted in the view he had taken of the part played by the iodide of magnesium. He urged those present who might be going into the country on a photographic tour not to be dissuaded from using his collodion by mere theoretical objections, but to do as their worthy chairman proposed doing, give it a trial; and he was sure that those who did so would not in future return with a very few good negatives and a great many bad ones, but with very few of the latter and very many of the former. He had used it himself for years, and with uniformly good results; and, therefore, however objectionable its mode of manufacture might be theoretically, practically it was the very best he had ever tried. In conclusion, he might observe, that it could not be supposed that he had any object in view, beyond the desire to see the beautiful art they all loved carried to the highest pitch of perfection to which it was susceptible. (Mr. Malone, interrupting, "Not smothered with paint!"—Laughter.) Mr. Mayall did not understand the allusion, and, after a few further remarks, he sat down.

The Chairman congratulated himself on his prescience in foreseeing that the paper which had been read that evening would give rise to an interesting discussion. He was sure that all who had listened to the observations that had been made, must have been deeply interested. For his own part, he must confess that he was not a scientific photographer, and was grateful for the light which scientific men threw upon the practice of his art. At the same time, he could not help observing, that there were many things which occurred in the practice of photography which science could not explain, or, rather, it did not do so. In practice, he met with many obstacles which no scientific theory would enable him to surmount; and he was, therefore, compelled to apply such remedies as suggested themselves to him at the moment; and he must add, that these were frequently successful, though, possibly, scientifically speaking, they had no right to be so.

Mr. Malone rose at the conclusion of the chairman's speech, and attacked him with considerable warmth and vehemence for making use of such heterodox language. He asserted, that it was to the chairman, and men like him, who spoke contemptuously of the theoretical photographer, that scientific men, who studied the subject, owed many of the difficulties they encountered; and which difficulties would never have arisen, if the practical photographer had had the slightest knowledge of the elementary principles of chemistry. In fact, it was the haphazard manner in which purely practical photographers went to work to remedy what they considered a fault, that produced the very difficulties of which they complained, to which scientific men were unable to find a solution. He did not impute the prevailing ignorance of chemistry to him as a fault, inasmuch as it was not the practice in this country to instruct youths at school in that science, as it ought to be. At the same time, he must protest against the labours of scientific men being sneered at, as was too frequently the case among men who termed themselves practical.

The Chairman replied, in an extremely good-humoured tone, that he submitted to the rebuke that had been administered to him, although he had not the least intention in what he said to question the value of the services rendered to photography by scientific men. Nobody was more deeply impressed than himself with the obligations they were under to those scientific members of the Society who devoted their time and talent to the advancement of the photographic art, but he must repeat, that photographers met with difficulties in practice of which those who simply followed it in theory had no conception; and he further thought, that if any grand discovery was made in photography, it would be due to the practical man, and not to the mere theorist.

The conclusion of the amiable Chairman's speech was received with considerable applause; after which the meeting broke up.

Miscellaneous.

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Phosphorescence of Gases.—We would direct our readers to the following experiments by Edmund Becquerel, as they are a first step in the direction of the study of the phosphorescence of gases, a subject hitherto unexplored:—" M. Ruhmkorff drew my attention to the fact that, in certain tubes, containing only rarefied gases, which had been sent to him by M. Geissler, there were visible, after an electric discharge, certain luminous appearances, continuing but a few seconds, and resembling those emitted by the phosphorescent materials I was then using in my researches. From this I was led to study the passage of electrical discharges through rarefied vapours and gases, causing, as is well known, certain effects of colour, dependent on their nature, in order to discover what are the particular gases which yield the effect of luminous duration, and whether these phenomena are similar to those of phosphorescence observed with the use of solid bodies. In most of the tubes containing such gases as hydrogen, sulphuretted hydrogen, protoxide of nitrogen and chlorine, a faint light is observed, remaining after the passage of *electricity of induction*, or even after a simple discharge from an electric battery, but the effect appears confined to the interior surface of the glass tube. It is not caused by the phosphorescence of the glass; for tubes, exposed to the action of a bright light, and then placed in the dark, exhibit no effect of this kind, and the use of the phosphoroscope is necessary in order to ascertain what results are due to the glass, which are found, however, to be more evanescent than those following the action of electricity. The effect exhibited by the tubes containing these gases appears to result from an electrisation of the glass, or of the layer of gas adhering thereto. With oxygen a different effect is observed, when shocks from a powerfully charged induction apparatus are passed through a tube containing this rarefied gas. If the passage of the electricity be suddenly arrested, the tube appears illuminated with a yellow tint, which continues some seconds after the interruption, and goes on decreasing, more or less rapidly, according to laws which as yet I have been unable to determine. To make the effect more manifest, the electricity passed through the gas must have a certain amount of tension. It is also preferable to interpose a condenser in the current, and to cause sparks to pass at intervals in the air, between one of the conductors of the induction apparatus and one of the platinum wires which pass into the tube. A simple discharge from an electric battery of several jars produces the same effect. In order to observe the persistent luminosity, it is necessary to work in the dark, and to keep the eyes closed during the discharge, in order that the retina be not affected at the instant of the passage. It is necessary that the portion of the tube in which the discharge takes place should be at least six or eight inches long. The particular effect which illuminates the tube occurs with the particles of hydrogen themselves, and does not extend to the surface of the tube. For, in using vessels of the capacity of about fifteen cubic inches, the entire body of gas becomes opalescent. In lengthening the tubes beyond the platinum wires, it is also found that the rarefied oxygen outside the part which immediately receives the discharge also emits light. On the other hand, this opalescence of the gas shows, that the effect does not result from electric discharges caused by the electrisation of the glass, and which would pass through the illuminated portion after the cessation of the inductive discharge, which effect may also be produced by rubbing the exterior of the tube. When a tube is under the action of a luminous persistence, at the moment when the electricity is passing, a yellow tint appears, illuminating the body of gas in the tube, and that independently of the various tints exhibited by the electric sparks produced by the mixture of gases. When this yellow tint disappears, the effect of persistence ceases to be observed. It is even possible that some gases, mingled with oxygen, increase the duration of the persistence; for tubes prepared under apparently similar conditions have exhibited different effects of intensity and duration. If the experiment is made with a tube containing a small quantity of rarefied oxygen, a certain time after the passage of electricity, the effect of persistence ceases to be appreciable. This result would seem to show, that the particular property now under consideration disappears at the end of a certain time in the gas. Whether it be connected with the formation of azone, which, under ascertained conditions, cannot go beyond a certain limit, is what I have not as yet been able to discover. Sulphurous acid gas has sometimes presented an appearance similar to that of the oxygen; but, the effect not being always produced, I have thought that it was caused, perhaps, by a partial decomposition of the gas, and a mixture of oxygen, in the same manner as rarefied air in presence of phosphorus. I am, however, still pursuing these researches, and hope to be able to ascertain whether, by the aid of a similar method as that used by me in the phosphoroscope, other gases and vapours, besides oxygen, may not produce effects of luminous persistence, of shorter duration than that observed with the latter. The phenomenon exhibited by the oxygen, and, perhaps, in different degrees by other gases, depends probably upon a particular action produced by electricity; for the solar light, and the electric light itself, do not exhibit any phosphorescence of this kind. Whether or not this is the result of the vibrations produced in the particles of gas, or of a particular state of infinitesimal electrical tension, continuing for some instants, or from some other physical or chemical cause, is what I have still to discover."—*Cosmos.*

Scenery of the Moon.—By means of the telescope, mountain peaks are distinguished in the ash-grey light of the larger spots, and isolated brightly shining points of the moon, even when the disc is already more than half illuminated. Lambert and Schroter have shown, that the extremely variable intensity of the ash-grey light of the moon depends upon the greater or less degree of reflection of the sunlight which falls upon the earth, according as it is reflected from continuous continential masses, full of sandy deserts, grassy steppes, tropical forests, and barren rocky ground, or from large ocean surfaces. Lambert made the remarkable observation (14th of February, 1774) of a change of the ash-coloured moonlight into an olive-green colour, bordering upon yellow. "The moon, which then stood vertically over the Atlantic ocean, received upon its right side the green terrestrial light which is reflected towards her, when the sky is clear, by the forest districts of South America." Plutarch says, distinctly, in his remarkable work "On the Face in the Moon," that we may suppose the *spots* to be partly deep chasms and valleys, partly mountain peaks, which cast long shadows, like Mount Athos, whose shadow reaches Lemnos. The spots cover about two-fifths of the whole disc. In a clear atmosphere, and under favourable circumstances in the position of the moon, some of the spots are visible to the naked eye, as the edge of the Apennines, the dark, elevated plain, Grimaldus, the enclosed Mare Crisium and Tycho, crowded round with numerous mountain ridges and craters. Professor Orgelander remarks, that a map of the eastern hemisphere, taken with the Bay of Bengal in the centre, would bear a striking resemblance to the face of the moon presented to us. The dark portions of the moon he considers to be continential elevations, as shown by measuring the average height of mountains above the dark and the light portions of the moon. The surface of the moon can be as distinctly seen by a good telescope, magnifying 1,000 times, as it would be if not more than 250 miles distant.—*Curiosities of Science, November*, 1858.

Photographic Notes and Queries.

◆

PORTABLE DARK TENT.

Sir,—Allow me, through the medium of your excellent paper, to describe a photographic tent, which I can confidently recommend (from experience, having tried several), as being the *most convenient* that has been hitherto invented—

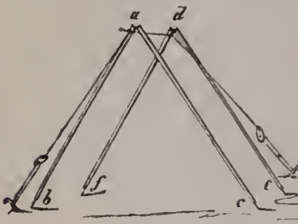


Fig. 1.

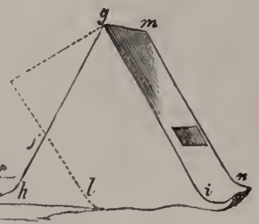


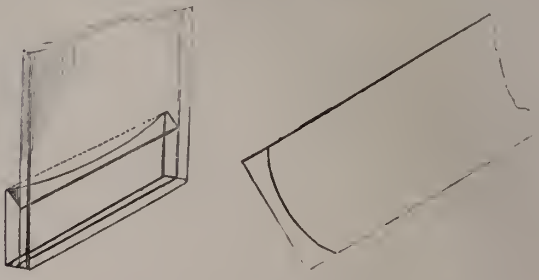
Fig. 2.

ab, *ac*, *de*, and *df*, Fig. 1, are four poles, 5 feet long, of $\frac{3}{4}$-inch seasoned pine, hinged at *a* and *d*, and having steel spikes at *c*, *e*, *b*, and *f*. Through holes at *a* and *d* is passed a strong cord, which has two knots, at 34 inches apart, *within* the points *a* and *d*, thus keeping the whole taut and firm when the ends are secured by means of tent pegs, as shown in the figure. The covering consists of equal lengths of the thickest black twill lining and yellow glazed calico, of a yard wide, four yards of which are tacked on to form the two sides, leaving, of course, nearly 12 inches over at the bottom, to rest on the ground, for the better exclusion of white light. To cover one end, two yards are to be tacked from *g* to *i*, Fig. 2, leaving a similar overplus at *i;* this piece is also tacked along *g j*, the overplus, *g r j*, being cut off, reversed, and stitched on to *j l*, and tacked at *j h*, which completes one end. The other is covered in a similar manner, except that it is double, and each piece is tacked only on *one* side, thus lapping over each other and forming the entrance. The window is in the side, and may be of three or four thicknesses of yellow calico, size 18 inches by 12. When erect, the tent covers fifteen square feet of ground, which is ample space for the manipulation of any reasonable sized plate. It can be "pitched" or taken down in the space of two minutes, and is proof against wind, or even a shower of rain. To pack it, the ends are folded in first, closing the hinges; then, by doubling it up, the four poles are brought into contact, on which the whole may be rolled, the cord serving to secure it, or it may be slipped into a tubular case of oil cloth to preserve it from injury. The tent takes ten yards of each material, and the whole costs about twelve or thirteen shillings. R. P. H. N.

PROTECTION OF GLASS BATHS.—IMPROVED DIPPER.

Sir,—One of your correspondents, in a recent number of the "News," mentions an accident, which resulted in the destruction of a valuable glass bath. Mishaps of this kind, arising from the glass plate slipping from the holder and cracking the bottom of the bath are, as I have found to my own cost, by no means uncommon. But the remedy is simple; and consists, either in covering the bottom of the bath with a strip of *pure* gutta percha, about a quarter of an inch thick; or, with a stratum of finely broken glass, over which is fitted a piece of plate glass to prevent the disturbance of any sediment by the dipper when the bath is in use; or, similar security might perhaps be obtained by dissolving *clean picked* shel-lac in alcohol, to the consistence of varnish, and distributing it equally over the bottom of the bath to the depth of a quarter of an inch. By employing *broken glass*, all chance of contamination from organic matter is removed, and this is the method I prefer.

Your notice of Mr. Lake Price's silver wire dipper is valuable, as this dipper affords ample protection against the *slipping of the plate;* but I fancy that wire of the absolutely required *purity* is very difficult to be obtained; and it sometimes happens, that both *plate* and *holder*, in the experiments of "bunglers" (and old hands often bungle in hurried manipulation), make far too precipitate a retreat to the bottom of the argentine solution to be unattended with danger to the bath. In all cases, therefore, I should advise the adoption of one of the precautions I have suggested.



These figures represent the bottom of my dipper.

The glass dippers which I employ, are made as follows:—The strip of glass, forming the bottom of the holder, is cemented thereto with marine-glue in the usual manner; but, before attaching it, I grind off the *inner top edge*, or the side which is attached to the holder, on the *flat* side of a common grinding stone; and, having done this, I place the ground edge vertically on the convex side of the stone, and hollow out the top to within $\frac{3}{16}$ths of an inch of the whole length on each side. The glass plate, however unevenly cut, will thus rest against the face of the dipper on two *projecting points* at the bottom, and obviously acquire additional security. W. L.

PREPARATION OF SACCHARO-SULPHATE OF IRON.

Sir,—In reply to your letter, I send you the following extract from the Pharmaceutical Journal, for December 1st, 1857:—

Protosulphate of Iron with Sugar.—"It is extremely difficult to prevent the oxidation of sulphate of iron; nevertheless, in chemical research, and for use in pharmacy, it is important to have a pure protosulphate of iron. According to M. E. Latour, the addition of sugar preserves the salt from alteration. M. Latour has shown, moreover, from careful analysis, that the salt crystallises with sugar in a regular manner, and of a definite composition. It is prepared in the following manner:—

"200 parts of pure protosulphate of iron are dissolved in 100 parts of boiling distilled water; 50 parts of crystallised sugar (sugar candy) are also dissolved in 30 parts of boiling distilled water. On mixing the liquors, and rapidly filtering, crystals are deposited between 95° and 100° Fahrenheit. These crystals, collected and dried between folds of blotting paper, should be preserved in a dry bottle. By concentration, a fresh quantity of this salt may be obtained. The crystals are oblique, rhombic prisms, having the composition—

Protosulphate of iron	54·57
Water	32·5
Sugar	12·93
	100·00"

I procured some simply for medicinal purposes; but, upon seeing it, it immediately occurred to me, that it would be an admirable photographic agent, and so it has proved in my hands. It is optional to increase or diminish the quantity of the salt to each fluid ounce of the developer, viz., in any of the ordinary negative and positive formulæ; but, I think, as the saccharo-sulphate produces a very uniform and dense reduction on the plate, a smaller quantity is required than when the common sulphate is used, and this remark applies more especially to positives. I have been trying the effects of replacing the organic acid in the developer by a mineral one, but at present cannot say much as to the result. Nevertheless, I believe sulphuric acid, in proper quantities, may be substituted for acetic acid. *Nous verrons.* HUGH ROBERT RUMP.

COMPARATIVE EXPERIMENTS ON DRY PROCESSES.

SIR,—Your correspondent "W. L.," in his reply to my remarks on dry processes, commences with a good idea, namely, a faithful report of a committee of practical and unprejudiced photographers on the comparative merits of the various dry processes. I myself have no objection to become a member of such committee. It is not my intention here to reply fully to your correspondent; I am about to write a paper, giving full particulars of the experiments I have been engaged in with the three processes in question, illustrated by prints from negatives taken at the same time and of the same subjects by Dr. Hill Norris, Taupenöt, and Fothergill. Just allow me, however, to inform "W. L." that he is quite mistaken, when he assumes that I used the *same collodion*, and did not excite Fothergill's plates in the acidulated bath. That would be one way, certainly, of making comparative experiments, but not the one adopted by myself. If your correspondent had paid attention to the first portion of my letter to you, he would have discovered that I must have been particular, inasmuch as I had plates prepared by an eminent firm in London sent down, prepared by them after Fothergill's and Dr. Hill Norris's plans in plates extremely well prepared, especially judging from the results of the latter.

Allow me to make one or two remarks in reply to "Photos" respecting his failures in Taupenöt's process. He does not accurately describe the cracks. I would ask, did he fix with *hypo.* or *cyanide?* If with the former, possibly he had it prepared *too strong*. If this had nothing to do with the cause, did he omit the sugar solution in the albumen, and afterwards bake his plates in too hot a place? a *warm* oven is better than a *hot* one for the purpose. As to blisters in the process, if your correspondent will only adhere strictly to the following simple instructions he will not encounter blisters. *Slightly warm* the plate before coating with collodion; allow *it to set well;* always work in a dry and warm room, kitchen, if you like; before beating up the albumen, put a bit of lump sugar, *an ordinary lump*, into it: and if he has blisters after attending to this, it will puzzle me to know the cause. I never meet with such a thing in my operations. The collodio-albumen process takes a little more time than most others, but the results are worth the trouble; a more sure and certain process there is not, not even excepting the wet process itself. Fothergill's process, as I stated before, is a very good one, but not so certain as Taupenöt's, and I contend, not so quick. I never expose longer with sunshine than from 45 to 60 seconds with 4 in. focus, $\frac{3}{16}$ stop; and I don't think "W. L." can work quicker than this. As to trouble and time in preparing, I can with ease prepare one doz. stereo. plates in one hour. JOHN DRAFFIN.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

SIR,—Your correspondent "H. I. (M.R.C.S.)," who complains of the disappearance of his pictures on the application of the varnish, will find a simple (and, as I believe, the only) cure for the annoyance, in the addition of a little soluble cotton to the collodion employed.

Some years ago I had much trouble from this cause, and tried many varnishes; and I found that pictures taken upon the thin collodions sometimes used, are always readily dissolved by *spirit* varnishes, and that for such pictures some other protection must be used, as the turpentine or chloroform varnishes. I never now use strange collodion without trying on a spoiled or otherwise valueless picture its varnish-bearing properties.

It will sometimes be found that a streak or cut is formed at the edge of the pool of varnish first poured on; this indicates that the film is but just strong enough to bear the solvent action of the varnish, and it is advisable in this case to heat the plate as little as possible before varnishing, and to keep it slightly in motion during the process, to prevent the formation of a stationary line of varnish.

C. P. W.

THE STEREOSCOPE.

SIR,—May I be permitted to say a few words regarding Mr. J. W. Fall's plan of looking at stereograms through a single aperture (vol. ii. p. 71).

1st. The stereograms must be mounted "with the pictures reversed," *i.e.*, the right hand picture on the left side; and a slide so mounted will be pseudoscopic when viewed in a stereoscope.

2nd. The eyes being crossed to a distance of five or six inches is, to say the least, disagreeable.

3rd. The image is virtually formed in the aperture, where the rays cross, and therefore appears very small; and if the slide be mounted in the usual way, will be pseudoscopic.

On the other hand, if a slide be viewed through two apertures, each eye looks at its proper picture, and the eyes being focussed (so to speak) for the distance of the slide, the image appears to be of its natural size.

By "image" I mean the effect produced on the mind by the blending of the two pictures.

The chief use of the box which I proposed is to keep all light from the eyes, which is not required to see the slide; and the diaphragm prevents the external false images from being seen, but a slide can, after a little practice, be seen stereoscopically without any apparatus, as I proposed in my first letter.

Can any of your readers explain the fact, that if a slide be inverted in a stereoscope the effect is still stereoscopic, not pseudoscopic, although each eye is looking at its wrong picture? X. P. R.

DEVELOPING SINK.

SIR,—Always thankful for the many kind and valuable hints so often thrown out by you in your journal, I take the liberty of asking if any of your readers can furnish me with a good plan for a developing and washing sink, at the same time saving the silver, which becomes rather a serious consideration after a time, when negatives are made. I have lately made a new dark room, similar to that recommended by Lake Price, but I wish to make one answer the purpose of the two mentioned in that gentleman's book. If any of your correspondents can kindly suggest anything to forward me in this, I shall be greatly obliged. C. W.

THE FOTHERGILL PROCESS.

SIR,—I was glad to see the remarks by "W. L." upon the wholesale condemnation of the beautiful "Fothergill process" contained in your former number by Mr. Draffin. Allow me to add my testimony, to that of "W. L." and other of your correspondents, as to the successful results to be obtained from it, if proper care be taken in the manipulation. I have found much more uniform results from this than from any other dry process which I have tried, and certainly in keeping qualities it is far superior. I enclose you a print from a plate which was exposed early in the present month, having been prepared in October last, nearly six months. The exposure was 13 minutes, before 8 o'clock, a.m., $\frac{7}{8}$th stop, focus 18 inches.

Being very doubtful as to its success, I was not sufficiently careful in development, hence the stains you see in the corner; but for amount of half-tones and beauty of detail, I do not think it could be surpassed by any other process. The print is toned with Mr. Hardwich's alkaline gold bath, which I have found very satisfactory. J. C.

[Considering the length of time the plate was kept sensitive, the specimen print forwarded by our correspondent is one of the best we have ever seen.—Ed.]

CLEANING DAGUERREOTYPES.

Sir,—For the information of your correspondent "Zingib," vol. ii., p. 71, as to the best method of cleaning daguerreotypes from dust, I send the following directions:—Let him take the plate out of its case and blow the dust off, by means of an elastic bottle; if some still remain on, wash the picture in distilled water, and dry it as follows:—Take hold of the silver plate by one of its corners with a pair of pliers, cover the plate with distilled water, and apply a lighted spirit lamp to the under surface, gradually warming it, and then slanting the plate a little so that the water may run off by one of the corners, follow the receding water with the lamp, and at the same time blow the water steadily with the mouth; in an instant or two the plate will be dry and bright; be careful in drying not to heat it too much, or the silver will exfoliate. In case of an oxide being formed on the surface of the plate, dip it in a weak solution of cyanide of potassium until it is cleared, wash carefully, and finish as above. J. I. Maginn.

SUBSTITUTE FOR A GLASS ROOM.

Sir,—Your correspondent Mr. Doubleday has been kind enough to suggest the substitution of a calico waxed tent for a glass house, but it occurs to me that the wax would *melt* under a hot sun, and in a short time the tent would be anything but waterproof. But, as experience is always better than theory, will Mr. Doubleday kindly state whether my supposition is likely to be correct? I am anxious to ascertain this before incurring the expense of constructing a tent that may not answer the purpose. Possibly some of your readers may be able to suggest a better preparation than wax? I have thought of resin and turpentine, but the colour, I suppose, would be objectionable? A good cheap tent of this description for amateur photographers is a great desideratum in the neighbourhood of London. Beta.

ANSWERS TO MINOR QUERIES.

Cement for Glass.—A *Correspondent, F. O. Y.*, has favoured us with the following cement, which he has found to be excellent for joining broken glass baths. Mix together in a mortar two parts of albumen and one of white cheese, and add lime until it is of a proper consistency; then apply it to the surfaces to be joined, and press in contact. When the cement is dry, fill the vessel with vinegar, which will coagulate the albumen, and render the cementing perfect.

Dark Stains on Positive Prints.—*Lorimer*. The cause of the stains like grease which appear on your positive prints when mounted, is the soaking through of the gum arabic. The washing to which the prints have previously been subjected has soaked away the size in places, and when the back of the print is coated with gum arabic it soaks through in these places, and appears as a dark, greasy-looking stain on the face. As a remedy, mount your prints with good starch paste.

Levelling a Camera.—*Tourist*. The best plan will be to take a small circular spirit level with you. In default of this, you will find a suggestion, which was made by Mr. Wilkinson in the pages of a contemporary some years ago, extremely useful. He suggested fastening a leaden bullet to each end of a silken thread, about a yard long, and then having drawn a perpendicular line on each side of the camera, exactly opposite to each other, place the thread over so that each end hangs down along these lines. If the thread does not touch the lines all the way down each side, one or other leg must be adjusted until the thread lies close to it along its whole length, and the camera will be perfectly level. Mr. W. further suggests that if knots be made in the silk cord one foot apart, it would do occasionally for measuring purposes.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

H. S.—Any eminent professional photographer would, we should think, undertake to give you a fair opinion on your lens for a fair remuneration.

F. L. O. S.—We think so.

P. S.—Your developer is correct. The fault is either in the collodion not being adapted to taking positives, or in the bath being too acid. Partially neutralise the bath first; and if that does not remedy the evil, change the collodion. If our correspondent takes no more notice of the information contained in the body of the "News" than he does of the proper initials of the Editor, we are not surprised at his want of success.

C. Kemp.—1. You should have carefully studied our first volume, and you would have found many of your difficulties explained and removed. 2. It would be impossible for us to give any idea of the value of the second-hand apparatus you describe. 3. Purchase your chemicals ready-prepared for the present. 4. English lenses are considered the best. 5. See vol. ii. p. 3.

C. Williams.—We frequently use pyrogallic acid after it has become quite brown, but cannot advise its employment for very delicate work.

Tyro.—It has been *discovered* three separate times to our certain knowledge.

T. Clark.—Cannot our correspondent communicate to us the particular information in writing which he so kindly offers to give us. Our time is so fully occupied, that we cannot at present appoint a time for an interview.

J. M.—If our correspondent will tell us the particular points in the daguerreotype process upon which he desires information, we will endeavour to assist him; but to answer such a very general request as he has now forwarded, would require us to write a book on the subject.

Captain A. N. S., India.—We are much obliged for our correspondent's beautiful views of India; and have posted to him, in return, eight stereograms of English scenery. Not, however, all from our own negatives, as we, unfortunately, have no duplicates, but a selection.

J. J. Jones.—We can only advise you to advertise in our columns; and we have no doubt you will meet with an answer such as you wish for.

W. G. Jackson.—A good lens, bright light, and chemicals in perfect order, are all that are necessary for taking instantaneous pictures.

T. N. S.—1. Your former letter was answered by post within a day or two of its being received. 2. You are quite correct in acidulating your bath with acetic acid, in spite of what your friend says. Only just sufficient should be put in to give it an acid reaction; and either dilute or glacial may be used, if pure, in quantities proportionate to their strength. Many thanks for your stereogram.

T. N.—J. C.—Received.

A. G.—An agate burnisher can be procured at an artist's colour manufacturer. Consult our advertising columns.

Artisan Amateur.—1. The process is not a very good one; we gave a better formula at vol. i. p. 108. You should use *French* photographic paper, not *English*, for this purpose. The cause of the white spots is, insufficient silver in the exciting bath. 2. No; the waxed paper process is best suited for foreign paper. 3. The stop should be as far from the lens as can be, so as not to give dark corners in the picture.

Persigney.—1. Use a twin-lens camera. 2. Measure the distance of the lenses apart from *centre* to *centre*.

R. W. F.—1. Your picture is quite up to the mark of an amateur's *first* production; but by no means as good as you will soon get if you persevere. 2. It would be improved by being slightly deeper printed. 3. Not sufficiently toned. 4. See the positive printing process of our correspondent θ, in a recent number. Your print is not sufficiently washed; we can almost see it fading before our eyes.

J. Luck.—No practical and certain process has yet been brought out, whereby a collodion plate can be kept with its sensitiveness unimpaired for two or three hours, and at the end of that time give results equal to an ordinary wet plate. Try some good dry process.

A Hitch Somewhere.—You had better write to the firm and ask for an explanation; we cannot interfere.

A Photographic Tyro.—1 and 2. From your account of the effect, we should think that the silver bath was not strong enough. Strengthen it, and add a little more gold to the toning bath. 3. New eggs give the most brilliant whites; stale albumen has a tendency to turn the whites of the paper yellow.

Novice Mux.—Transparencies for the magic lantern are printed from negatives on a dry plate, and developed in the ordinary manner. They then appear as positives when looked through.

Excelsior.—1. See letter in this number. 2. Only well washed. 3. The silver bath should be about three times as strong as the salting bath in the positive printing process.

B. Gorbi.—Try the alabastrine process, as given in our first volume.

A. B. B.—No plan will give, *direct*, a collodion positive equal in brilliancy to the one which you have enclosed, and which has been polished with wash leather.

Communications declined with thanks:—P. A. R.—A Mechanic.—Tomkins (We have already published the same plan).—Isa. B.—Caspar.—Stereo.—Emily B.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Letter B.—Querist.—A. Z.—Hypo.—A Perplexed Novice.—London.—M. C. H.—Jago.—"Tre Pol and Pen."—A Photographer.—Uncle Tom.—F. C aching.—Electricity.—C. B. O.—O. T. U. A. B. C.—Lime.

In Type:—T. F.—M. P. M.—Alfred Keene.—W. A. Young.—E. S.—J. B.—H. S. I.—A Kerry Man.—Viator.—Evargrah.—Camera.—G. W. C.—O. A. Aliquis.—T. Millard.—N. T. A.—W. W. Hughes.

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⁂ Subscribers can have the numbers of the first volume strongly bound in cloth, lettered, for 2s., if sent to the office; or, if accompanied by a cloth case, the charge for binding will be 6d.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 36.—*May* 13, 1859.

COMPARATIVE EXPERIMENTS ON SOME OF THE DRY PROCESSES.

BY MR. JOHN DRAFFIN.[*]

I think it is now generally admitted that on journeys for photograph practice, a good dry process is far superior to the great inconvenience of taking out all the apparatus requisite to work the wet collodion process, especially in hot or windy weather.

Now, having for the last twelve months been exclusively engaged in outside practice, as well as cathedral, &c., interiors, I, of course, have endeavoured to ascertain, with some degree of certainty, which of the various processes recommended, would suit me the best. Accordingly I made a series of experiments with the following:—M. Taupenot's, Dr. Hill Norris's, Mr. Fothergill's, the Honey and Raspberry Syrup processes. The result was that I rejected the two latter, and determined to continue my practice with the three first named, which I did for a considerable time, taking three negatives of each subject—one by each of the three methods.

It is not my intention to argue that this, that, or the other process is best, but simply to lay before you as accurately as I can, the results given, the method adopted by myself in preparing the plates, the length of exposure in each case, and the degree of light and nature of subject taken; and I purpose illustrating this to you by means of specimen prints. It will, then, be for you to judge which you think the best process to adopt for general purposes. I say, all three are exceedingly good, and especially are they so for out-door practice; in fact, for this purpose there is very little to choose between them when proper care is taken in manipulation. But, as I proceed, you will perceive that it is not only for outside photography that a process should be good to make it all that is wanted. I find to a certainty that in places where there is a deficiency of light—as for instance, a thick wood, or the interior of a church or cathedral—that M. Taupenot's process must take precedence of all others. This I can prove, I think, to your satisfaction, when I state that a short time ago, a fine old chest was taken out of the wall of the vestry of York Cathedral, where it had been hid for a long time. This chest being a magnificent thing of its kind, I determined to obtain, if possible, a photograph of it, and obtained permission to do so. Accordingly I set to work with three plates—Taupenot's, Fothergill's, and Norris's. Now, the chest being immovable, is fixed in a niche in the wall of a dark dismal room, the vestry, and is itself quite black. I exposed each of these plates five hours. The result was that Fothergill's was a failure, completely so—Norris's considerably better—and Taupenot's, the specimen before you, which I think you will admit is a good picture, considering the circumstances.

Now, on the other hand, outside, I exposed, on the same day, one each of Taupenot's and Fothergill's, from the same series of plates, prepared at the same time. The "Ruins of St. Mary's Abbey, from the City Walls" is the one in question. It was taken at twice; one half of the picture is by Fothergill's, the other Taupenot's; the latter you will perceive is more exposed, to all appearances, than the former. The time given was: Fothergill's, 1 minute; Taupenot's, 35 seconds; full sunshine, 4 inch focus, ¼ inch stop, as a proof that the exposure was quick. You will perceive in Taupenot's that several men who were at work in the grounds are actually taken in the act of filling a barrow, although they had no notion that I was photographing—in fact, I was at least one-eighth of a mile distant. I will now call your attention to three other pictures of ordinary light and shade, viz., grass, trees, masonry, &c. These views were taken immediately after each other—the exposure as follows: Taupenot's, 45 seconds; Dr. Hill Norris's, 1 minute; Fothergill's, 1¼ minutes; and also to another picture taken from a great distance, so as to enable me to obtain the various objects of interest a moderate size for a picture, I used a 14 inch focus, powerful lens, with an ½ inch stop. I gave both pictures (right and left) the same exposure, 2 minutes: one is Fothergill's, the other Taupenot's; the plates used were the ordinary 6¾ × 3⅜, but the prints were cut down to make a stereogram. Now, you will see here that there is a very marked difference between the two pictures. The next I would call your attention to is a picture taken by Dr. Hill Norris's and Taupenot's, the exposure being exactly the same—1 minute, rather weak sunshine. Very little difference here, but Taupenot has it. Next, to two interior views of York Minster—one by Fothergill's, the other Taupenot's. Fothergill was exposed 4 hours, Taupenot ¾ of an hour, both the same subject—the Nave—only one looks east the other west; the light all came from the south, so that both had the same light. Here you will see there is no comparison. The beautiful view of the South Aisle in York Minster is, perhaps, the best one of the kind I have produced. It is a Taupenot plate; and you will observe, although exposed a full hour, the beautiful window is perfectly given, and has not suffered from over exposure. In this respect I find Taupenot's process far superior to any other, and it is here chiefly where I am at issue with those who condemn this process, because if their practice has been confined to country, &c., views, they are not capable of judging the great merits of the process. Comparatively speaking, I am aware that very few interior pictures are done, because of the great and manifold difficulties to encounter. Still, if we want to adopt *the best dry* process, it must be that one which is equally good for interior as well as exterior, and not the one good for exteriors only.

Now, from the remarks which have been made here respecting three processes, it will be inferred (and correctly) that I am in favour of the collodio-albumen process. I have no doubt some parties will say, you have not prepared your Fothergill's plates right; you must have let *one or two drops of the four drachm washings fall off one corner* of the plate, or you have washed too much. In answer I beg to say, I think I can manage the *four drachm washing* as expertly as most people; that I can also wash with a 10-grain silver solution; that Keen's collodion is to be had by me as well as by other people; that I know how to make a neutral bath of silver. I not only think that I can do all this, but have followed in my experiments all out to the letter. And I think I dare challenge the best practitioner in Fothergill's process to produce for me a good negative, taken in 25 to 30 seconds, 4-inch focus, $\frac{3}{16}$ stop, as I saw stated had been done some time since. I have put myself to a considerable amount of trouble and expense in ascertaining the above facts; because, knowing the amount of work I had before me, I was determined to find out and adopt that system best calculated to enable me to get together what I have—some hundreds of negatives of interest to all tourists in Yorkshire, &c.

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[*] Read before the Chorlton Photographic Association, May 11th, 1859.

For the benefit of those who may feel disposed to try their hands at a dry process, and for the satisfaction of others, I will proceed to state the mode I have adopted in preparing the plates by the various processes in question:—

COLLODIO-ALBUMEN.

Collodion.—Any collodion will do, provided it is not rotten. Old collodion is the best—and, as a rule, I prefer it thin.

Albumen.—To the whites of 6 fresh eggs, or 6 oz., add—

Water	$1\frac{1}{2}$ ounces.
Liquor ammonia	1 drachm.
Iodide potassium	$\frac{1}{2}$ ..
Bromide	6 grains.

A bit of lump sugar, say 2 drachms weight.

Beat all up for 20 minutes, or until it will froth up no more—this is best done with a bunch of a dozen quills, a table-fork must not be used. Let stand all night, and filter through sponge into a bottle—put a bit of camphor to it, and a little collodion round the cork and it will keep any time.

DEVELOPER.

Saturated solution of gallic acid This developer is best for beginners.	or,	Pyrogallic	2 grains.
		Water	1 ounce.
		Glacial acetic	20 drops.

Add to each ounce 4 or 5 minims of a 20-grain solution of nitrate of silver.

Fix with hyposulphate of soda.

For the bath take—

Distilled water	1 ounce.
Nitrate of silver	40 grains.
Glacial acetic acid	30 minims.

Before commencing to prepare the plates, rinse out a glass measure with a lip to it—don't wipe it with a cloth at all—pour off two or three ounces of albumen into it, and have another vessel ready to pour the albumen off the plate into—as it should not be poured back into the same vessel, or it will create bubbles, which the operator will find awkward to get off the plate. Line the kitchen oven with paper, and on the bottom put a clean cloth for the plates to stand on, and proceed as follows:—Before coating with collodion, WARM THE PLATE SLIGHTLY (let those who practice this method, and who are mortified by seeing their good negatives ruined by blistering, take particular notice of this), and coat with collodion, allowing *it to set well*, say half a minute; then sensitise in either the ordinary bath or in the aceto-nitrate. I use the latter, making one bath do for both purposes—sensitising the collodion and albumen film. I take care to keep the bath clear by means of kaolin—or what will suit as well, I find, *Fuller's earth*—and perhaps this is a fact worth knowing, as the former article is sometimes difficult to obtain. Take the plate out of the bath and wash for half a minute under a strong stream of water from a tap. This plan of washing I find far superior to the old plan of washing in bowls. By the latter plan the negatives generally were filled with innumerable specks or holes in the high lights and skies; by the former mode this is entirely obviated. Allow the plate to drain on blotting paper or a clean rag of any sort while you proceed with another plate, and by the time this is put into the bath, the former plate will be ready for coating with albumen, as follows:—Pour on, say a quarter of an ounce, and let it run all round the plate, pour off into a separate glass, repeat this with a fresh dose, and put the plate in the oven to dry. Mind no dust comes near it now. The albumen may, after all is done, be put back in the bottle again with a little camphor, and may be used over again two or three times. By systematic working eighteen plates may be prepared in one hour, which I should think quick enough for anything, besides the advantage that these plates, after coming out of the oven, will remain good for any length of time, provided they are kept dry. I have no doubt they will keep for years. The only thing to be done next is, when the plates are cold, to dip them into the bath again for one minute, and wash under a strong stream from a tap one minute. Well washing here must not be neglected or stains will follow. They may either be dried as before, or spontaneously; I prefer the former. The advantage of these plates to parties going long journeys must be admitted by every one. They may take out a quantity not sensitised, and should they become exposed to the light it is no matter, and the atmosphere has no effect (except moisture). By taking out sufficient silver and acetic acid, they can sensitise their plates the night before they are wanted without any trouble, and are then sure of good plates; but suppose a party (and I have known more than one instance), going abroad for two or three months, and taking a quantity of sensitised plates with him, how many negatives is he *sure* of bringing back with him out of every dozen plates, I should like to know? Or suppose some jealous Custom House officer insists on smashing his plate box open? (That has been done, too). Now, if the plates contained in the box were plain collodio-albumen ones, this would not matter, even if opened in strong sunlight; and, as a proof of this, I show you a plate which has been prepared upwards of two months, exposed to strong sunlight before the second immersion in the bath, has been sensitised six weeks, and it is three weeks since I exposed it in the camera; the length of time given was, with 4-inch focus, $\frac{1}{4}$-inch stop, sunshine, fifty seconds. Perhaps my friend Hooper will develop it for you.

In developing, care must be taken, and for parties who wish to begin the process, I should recommend them to use the gallic acid as a developer, adding three or four drops of 20 grain solution of silver. I use the pyrogallic generally, because it saves time; with that I can develop my picture in ten minutes. I would also warn beginners not to *over-develop* their negatives; I have seen many a good picture developed to such an extent as to be useless for printing purposes. There is a difficulty, especially to beginners, in judging by candle-light the exact time to stop the action of the developer. Now this plan will be found a good one. Develop till the detail in the shadows is well out, and then fix with hypo.; next day, by daylight, the negative may be brought up to the proper amount of density, and if the exposure has been right a good picture no doubt will be the result. With respect to the exposure in the camera, this so much depends on the quality of lens, the light and nature of the object, that I shall leave beginners to find this out for themselves. I have frequently heard it stated that thin skies are the result of over-exposure. This is quite a mistake. A great deal has been said about the trouble connected with this process. Now, sir, I find *it the easiest* process to work. There is not that exact amount of care required in washing—you cannot over wash the plates; if you want to prepare a quantity of plates in a hurry, you have not to run for this or that collodion—any will do; and if you have not used your bath for months, and don't know its condition, it does not matter. The great thing to be observed to ensure success is plenty of washing after the last sensitising, attention to the amount of exposure, and care in the developing. Should stains appear on the surface, they can easily be removed by means of a little cotton wool.

FOTHERGILL'S PROCESS.

I have adopted the following method in treating these plates. With Keen's collodion, a neutral bath is usually recommended. In washing I have found it the safest way to dip the plate into a solution of nitrate of silver, say 5 to 6 grains to the ounce. The four drachm washing gives, perhaps, rather quicker results, but not much so; and unless the greatest amount of care is taken, peculiar markings in the negative are sure to take place. If the four drachm method be adopted, it is certainly advisable not to use the same water twice over, but to pour on an equal quantity of distilled water on each plate fresh. The simplest and best method of preparing these plates, I think, was given in one of the journals some time since by an Edinburgh gentleman. I believe his name was Bell. His formula I tried, and found it to answer well; as also that recommended by him for making a collodion for this process, which I found to answer quite as well as Keen's. Perhaps, should this catch his eye, he will favour the public once more with his paper—to those who practice this process it would no doubt be of service. The plates, after albumenising, I allowed to dry spontaneously, and afterwards placed them in a hot oven. The developer used was the ordinary pyrogallic.

DR. HILL NORRIS'S.

I will glance over the method adopted by me in this process; if I am not taking up too much of your time. Any good negative collodion will do, but it should not be *new*, or sufficient amount of density will not be obtained. After sensitising in the usual way, I wash well the plates, and *immerse* in the gelatine, prepared exactly according to Dr. Hill Norris's formula, allowing the plate to remain in this a few minutes. It is then taken out and dried in a warm oven. The only difficulty I have met with in this process is that the film is liable to become detached. This, I have no doubt, depends much on the kind of collodion used; a tough one being the best, as it adheres more firmly to the glass. Great care must be observed in the development, as should stains take place the film will not bear touching. The developer used for this process is the ordinary pyrogallic. Fix with either hypo. or cyanide.

In conclusion, I beg to call your attention to a print which has been treated as follows:—The ordinary albumenised paper floated on the *back* on the solution of gutta percha, recommended some time since—the print was washed *five minutes only*, and has been printed nine months, constantly exposed to light. I merely wish to call your attention to the whites in the picture (not many certainly), but considering the amount of washing and the careless way in which it was done, I think it says a good deal for the gutta percha plan.

MONKHOVEN'S CELLULOSE PROCESS.

The following communication has been addressed to the editor of *La Lumière* by M. Van Monkhoven, dated Ghent, April 25:—

"I am truly sorry not to have been able to send you sooner the communication I promised you; but the fact is, the weather has been so bad here, that I could not make up my mind to make a single attempt to take a picture out of doors, which I could send you as a specimen of what my process is capable of doing. I therefore send you merely those I have by me. I may add, that they are quite good enough to convince amateurs of the value of the method I offer them.

"Thus, instead of collodion, I simply substitute an iodised solution of cellulose in oxide of cuprammonium. Let not the reader be alarmed by this long word—nothing is more easy than to prepare it.

"I begin, by preparing the oxide of copper, in the following manner:—In about ten quarts of luke-warm water, contained in a wooden or glass vessel, I dissolve three parts of commercial sulphate of copper. I also dissolve two parts of caustic potash in its weight of water; and when the two solutions are completed, I mix them. The liquid, when mixed, is of a greenish blue tint, but by agitating it strongly by means of a glass or wooden rod, and leaving it to itself for a few hours, the supernatant liquid will be found clear. This must be decanted with a siphon, and fresh water poured in, in order to free it from foreign salts (sulphate of potash, and potash in excess). The liquid must be allowed to stand for some hours, and decanted in the same way as before. Finally, this operation must be repeated three times to get the oxide of copper very pure; then the liquid must be emptied upon a linen filter to drain. The excess of water filters through, and, at the end of twenty-four hours, the mass acquires a pulpy consistency. This substance may then be removed from the linen with a wooden spoon or a piece of glass, and put into a wide-mouthed, glass-stoppered bottle, and an addition made to it of about nine parts of liquid ammonia of commerce. I ought to mention, that the ammonia should be as free from colour as possible. All the oxide of copper is dissolved by shaking the vessel, and a liquid is obtained of a splendid deep blue colour. This is left to settle for twenty-four hours; a certain quantity is then decanted—say a quart, for example—and into this is introduced three ounces of well-carded cotton—that used for polishing daguerreotype plates is excellent for the purpose. That all the cotton may be dissolved, the liquid is shaken at frequent intervals, and, after a few hours, this result is obtained, when it must be diluted with a quarter of its volume of water, which, in the example we are considering, would be a quarter of a pint. This liquid is that which serves us in our ulterior preparations. To facilitate this operation, I give the following figures:—

No. 1.	Sulphate of copper of commerce	3 parts.
	Caustic potash	2 ,,
No. 2.	Liquid ammonia	20 parts.
	Carded cotton	2 ,,
	And oxide of copper arising from No. 1.	

"M. Peligot's method is perhaps more simple. It is as follows:—

"In a rather large and deep glass funnel, imperfectly covered with a glass plate, put copper filings, or wire, or cut sheet—in fact, anything in the way of metallic copper at hand, provided it is in small pieces. Before putting the copper into the funnel, however, some pounded glass should be thrown in to prevent the liquid which is presently added from running through too quickly; then the copper should be added, and the funnel having been placed in a large glass bottle, the ammonia may be poured on. The copper, on contact with the ammonia and the oxygen of the atmosphere, is converted into oxide of copper, which the ammonia dissolves instantaneously. When all the liquid has passed into the bottle, it is left to itself for an hour, that the copper may oxydise well, and fresh ammonia is then poured on. This operation is then repeated until the liquor shows a very deep blue colour even in thin films. Cotton is then dissolved in it in the proportions given above.

"It is essential that the ammonia, in passing from the funnel into the bottle, should only do so drop by drop, otherwise it is not completely saturated with oxide of copper; besides, the same metal and the same apparatus may serve several times. It must also be observed, that the solution must be left to settle before dissolving the cotton therein, in order that it may be ultimately thoroughly free from impurities.

"It is advisable to perform this operation in the open air, that the operator may be protected from the vapours of the ammonia, which are sufficiently disagreeable even then.

"Let us also observe, that it is highly important to have a well-prepared liquid. To try it, pour a certain quantity on a glass; it must spread slowly and evenly. I have always succeeded badly with a solution too much diluted.

"When it is desired to convert the ammonio-cupric solution into a photographic substance, it is necessary to add about 5 or 6 grains of iodide of potassium per ounce, dissolved in double its weight of water. The liquid thus prepared will serve until exhausted.

"When it is desired to use it, a certain quantity must be poured on a glass, precisely as with the collodion, then the plate must be placed upon end so that the excess of liquid may run off, and the back wiped with a bit of blotting paper, and, while still wet, immersed in a bath composed as follows:

Distilled water	100 parts.
Fused nitrate of silver	10 ,,
Acetic acid crystallisable	5 ,,

"The film whitens instantly, and after a few seconds immersion the plate is withdrawn, and the succeeding operations continued as usual.

"It is rigorously necessary to add the acetic acid to the silver bath, because it is this acid which removes the excess of oxide of copper; nevertheless, it is advisable to diminish the quantity as far as possible; thus, one may take an ordinary bath used for collodion, add to it 1 per cent. of acetic acid, and if, after the development, a black proof is obtained, add to it 1 per cent. more. On the one hand, if there is too much acid, the rapidity of the process is diminished; on the other, if there is too little, black proofs are obtained.

"I have observed that one may succeed with an ordinary bath, strengthened with a very little acetic acid, half per cent. for example, on condition of leaving the proof in the bath for two or three minutes, and raising it from time to time with a whalebone hook; or, otherwise, by plunging the humid glass, first in water strengthened with acetic acid, drawing it out very quickly, and immersing it, after it has well drained, in neutral nitrate of silver. Practice alone can give an exact idea of this, but this is so important, that the time of exposure will be increased ten times, merely by using baths in which the proportions are badly established.

"But there is another point highly important to success, and it is this: when the liquid has been poured on the glass, and the latter has been placed upon the wall to drain, when ought it to be plunged in the silver bath, and what means ought to be adopted to render the action systematic?

"If after half a minute we look at the glass, we shall see a slight whiteness towards the upper part, and that it is still transparent towards the lower; if we then immerse the proof in the silver bath, one end is whiter than the other, and consequently the action of the light upon it is unequal. We must, therefore, wait until the entire of the film has acquired this whitish appearance before immersing it in the silver bath, and to assist this it can be waved in the air, but if the glass dries beyond this point, the rapidity is diminished.

"I ought to say that my experiments are not yet quite in accordance on this point, and not sufficiently numerous to give sound conclusions; but now that the weather has become decidedly favourable, I intend to attempt the perfection of this process by rendering it as simple as possible: for, it must be admitted that it is in itself much more easy than the collodion process: copper may be found anywhere, likewise cotton and ammonia, all at a low price. The purity of these substances is not an essential condition, and the process is extremely simple. If one obtains a good proof, one can rely upon succeeding with all the others. I think, besides, that the process will succeed well dry, judging from the essays I have made; but I will return to this part of the subject by-and-by; my object in giving the preceding information has been to facilitate the attempt of your numerous readers with this method."

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVE PROOFS.*

BY MM. DAVANNE AND A. GIRARD.

INSOLATION.

By a further experiment we may render more conspicuous the action of the nitrate of silver on the chloride of this metal. If we rub separately in an agate mortar dry nitrate of silver and chloride of silver, and expose them to the light, both will be seen to become coloured; the first slowly, because, no doubt, it is mixed with the ambient dust: the second with a greater rapidity at first, but which soon slackens. But if we bring the two masses close together with the pestle, the colouring will at once be seen to proceed with great energy at the points of contact. It is an experiment that everybody may verify, and which shows better than any other the influence of the liberation of the chlorine, and consequently of the formation of the chloride of silver in the nascent state, on the progress of the reaction.

We may then, henceforward, understand the respective parts played by the chloride and the nitrate of silver in the act of insolation. To exhaust the subject it remains for us to see what part the size performs in respect to these compounds.

We have long known the influence it exercises in the production of the proof; we also know that, on a sheet of paper without size, the greyish picture which is formed is entirely composed of metallic silver; but is it the same when the compounds we have been examining are in contact with an energetic size? Old experiments, which we are about to recall, enable us to affirm that it is not, and that in this case a combination is effected, under the luminous action itself, between the size and the silver.

By placing in the solar rays bottles containing solutions of gelatine, starch, and albumen, and solution of nitrate of silver in which chloride of silver existed in suspension, we have seen, in all cases, coloured precipitates form, which, collected and washed with very great care, are found to be formed, before the action of the fixing agents, of non-reduced chloride of silver in excess, of metallic silver, and organic matter; and after the action of the fixing agents, of metallic siver combined with an organic matter. The precipitate formed in the gelatinous solution burns with facility, gives carbonic acid with oxide of copper, ammonia with potash, silver by calcination; the precipitate formed in the starch solution burns the same, gives off carbonic acid, &c. It is unnecessary to dwell any longer on these experiments, which we quoted in an early part of our papers. Besides, these combinations offer varieties of colour and intensity, perfectly corresponding with those communicated to the proofs by these same sizes.

The action exercised by the size is therefore very evident; it gives rise, under the luminous influence, at the very moment when the silver is liberated, to combinations of organic matter and silver, presented under different colours that are communicated to the proofs in practical photography. But it was important to ascertain if the action of the size was exercised on the chloride or the nitrate. Experiment showed that it bore more particularly on the latter. If we filter the gelatinous solution used in the preceding experiments, and which, consequently, contains nothing but free nitrate and gelatine, it will still be seen to yield, under the luminous influence, the same precipitate formed of organic matter and silver; and the same result will be seen in the case of starch and albumen. This may be rendered more strikingly evident by preparing the coloured films in the following manner:—We spread on a glass plate a layer of albumen, on another a layer of pure gelatine; after desiccation the two plates were immersed in the nitrate of silver, washed quickly to remove the excess, and exposed to the light. Both glasses became rapidly tinted, assuming the colours proper to each of the sizes—the gelatine acquiring a purple tint, the albumen an orange-red tint. This combination resisted the hyposulphite of soda, which slightly modified the tint, and brought it to a clearer tone.

But if the operation be conducted in such a way that there is only chloride of silver in presence of the size, a slight influence may certainly be remarked, but compared with that of the nitrate it is inappreciable.

Hence, then, it is between the nitrate and the size that this operation is produced, and hence the luminous action exerts itself in a complex manner on the paper, for it colours it by the reduction of the chloride of silver, and by the formation of the combination which is effected between the silver and the organic matter.

In conclusion, let us group the preceding facts, and endeavour to deduce from them a general theory of insolation.

The luminous rays falling on the chloride of silver reduce it to a metallic state; the chlorine which is liberated, encountering the nitrate of silver in excess, decomposes it, forms with it a new chloride, which is acted upon more strongly in the nascent state, and gives greater force and rapidity to the progress of the insolation.

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* [illegible]

The silver thus reduced gives to the print a grey or brownish tint. No doubt it is to the feeble traces of sub-chloride of silver, formed at the same time, that the violet colouring, observable on the removal of the print from the printing frame, is owing, and which afterwards disappears under the operation of the fixing agents.

But the presence of organic matter during the reaction changes the result; a coloured combination of organic matter and silver is formed and fixes itself on the silver of the chloride, and covers the sombre tint of the latter with a more or less rich and intense colouring, according to the nature and quantity of the organic matter employed.

This theory explains all the facts we have hitherto stated; it shows why chloride of silver without nitrate, even in the presence of organic matters, only yields a proof which is dull and without vigour, the blacks of which will not agree in tone. Why, on the contrary, nitrate of silver employed without chloride gives with the size strongly coloured proofs, although harsh and not very agreeable to look at. Finally, why the mixture of chloride and nitrate of silver, in suitable proportions, will give vigorous proofs, to which the size adds the colour.

It likewise allows the explanation of the differences we have pointed out which exist between the different salts of silver, as respects their photogenic sensibility. If we turn back and examine what we have written on the subject of the compounds that may be substituted for the chloride of sodium for salting the paper, we must make the singular observation, that in presence of an excess of nitrate of silver the sensitiveness is greater, as the salt can, by its reduction, set at liberty a more volatile body. Thus, after the chlorides come the bromides, then the iodides, capable of liberating chlorine, bromine, and iodine which constantly forms new argentiferous compounds; and it is only after these that the phosphates, citrates, &c., can be placed.

PRESERVED LIGHT.

To the paper published in the "Photographic News" of last week, on the subject of preserved light, we add the following, which we take from *Cosmos*:—

"What is this reducing agent? M. Paul Thenard authorises us to publish a first experiment, which raises the veil a little. He took a white paper, which had been kept in a dark place, and exposed it to the vapour of water, which, consequently, was not only not insolated, but on the surface of which all luminous vibration was really extinct; he rolled this sheet of paper, and introduced it in a tube, through which he then passed a current of active oxygen or ozone, and afterwards closed it. Some time later he opened the tube in a dark room, and placed the orifice over a piece of paper sensitised with nitrate of silver; after the lapse of a few hours he discovered that the silver was reduced on the surface of the sensitive paper, and that the opening of the tube was very clearly designed in black upon it; evidently, this impression could only be attributed to the reducing action of the ozone. Nevertheless, strange to say, when he caused a current of ozonised air to pass into a tube containing a sheet of sensitised paper rolled round the inside, there was neither a reduction of silver, nor any visible impression on the surface of the paper. This double experiment was many times repeated by Messrs. Bouillon and Sauvage, and always with the same results."

We have been informed by Professor Wheatstone that a distinguished French *savant* has likewise tried various experiments with ozone, with the view of ascertaining the cause of the phenomenon which has excited so much discussion, and although on opening one of M. Niépce's insolated tubes an odour similar to ozone was clearly perceptible, an experiment in which he attempted to discolour chloride of silver, by means of ozone, failed to prove that this body was capable of exerting any action.

Critical Notices.

The Stereoscopic Treasury. London: A. W. Bennett.

During the past few years the improvements and alterations which have been made in the shape and adaptability of the stereoscope are truly surprising. At one time the instrument, compared with the kinds now in use, was heavy, unwieldy, and inelegant; now we have artistic and neat designs which, while they are a great advance optically, are also superior in point of taste. Among the various styles which we have seen, there are certainly none which excel the "Clairvoyant Stereoscope" in point of utility, elegance, compactness, and general adaptability; the focusing—usually a difficult matter in the best instruments—is obtained in this one so easily and correctly that even those who usually find great difficulty in using the stereoscope could not fail with this at once to obtain the desired effect. The instrument, by an ingenious device, is equally applicable to opaque and transparent pictures, and is made so as to fit into a compact case, in which may be stored a small library of stereograms. We are sure that it well deservos its title of "Stereoscopic Treasury," and needs only to be known to recommend itself.

Lessons on Colouring Photographs.

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ALBUMENISED PAPER—(*continued*).

Handling.—When a student of painting has become sufficiently skilful to feel sure of his touch, he naturally steps out from the very cautious style of proceeding with his picture, and feels a desire to produce effects more and more telling, until, ultimately, if he succeed, a masterly, forcible style of execution results. He no longer feels it necessary to stipple so faintly and so finely; and whereas, at first, he would not have thought it prudent to venture to lay on his colour more boldly than in scarcely visible dots or short strokes, from the fear of destroying the form of any part, he now can safely finish his picture in palpable lines. This is done to imitate the fine racy effect visible upon steel engraving; and, when conducted with due care, it produces a wonderful relief. To accomplish this end, having got on almost the full effect of colour, light, shade, and form, as directed in preceding chapters, the head may be gone entirely over again with touches, very fine, yet palpable, composed of the right colour for each place worked upon, and keeping the touches lighter in light parts, and stronger in shadow. The direction of these strokes will be suggested by the form of the feature they represent; for instance, on the front of a forehead, being nearly flat, they would be comparatively horizontal lines, whilst rounding down the sides of plump cheeks, they would be curved to produce rotundity.

The colour used will be regulated also, in some measure, by what is previously laid on; and, as warm colour tells best over a cold one, those underneath being cool, these lines will be made in warm colours. And it is well to observe that, in the preparatory stages, you should use such colours in every place as will, when worked over with this warm colour, produce the tint required. As, for instance, that pink, pearly hue round about the eyes in fair people—having washed them in previously with blue, if you line over that with lake, the effect is complete, and may be modified to suit any complexion: bilious people are rather yellow about their eyes, in which case add yellow to the lake.

The lines should not cross each other diagonally, as seen in Fig. 1, but as seen in Fig. 2. The interstices are to be filled up with dots, as in Fig. 3.

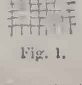


Fig. 1.

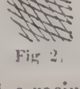


Fig 2.

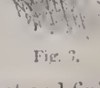
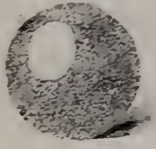


Fig. 3.

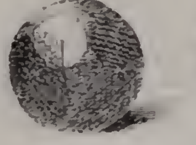
This process gives such a raciness of effect and finish, that when properly conducted no picture bears comparison in point of force, as will be seen below in figures F, G, and H.

F



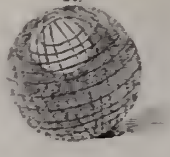
Without lines.

G



The process recommended.

H.



Too hard and formal: lined before the shadows were worked up.

The cause of a head finished in this way standing in stronger relief than if without lining, arises from the circumstance, that each line and touch makes of itself a distinct impression upon the eye, and comes out, from a similar principle that a distinct sound seems nearer than a soft one.

One thing more on this part of our subject: never think of using this lining finishing process until the effect of light and shade is almost complete—the likeness also; otherwise you will get on a hard, powerful effect like network, perhaps destroying the likeness; and upon this network you cannot regain it without extreme difficulty, because it prevents you seeing the light and shade so well.

(To be continued.)

Dictionary of Photography.

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Chromate of Silver.—A deep red salt, formed when a soluble chromate is mixed with nitrate of silver solution. Chromate of silver is almost unchanged in the light, even after an exposure to sunshine for many days, but it eventually assumes a darker shade.

Chrome Yellow.—This name is applied to chromate of lead when it is used as a paint. It has been fully described above.

Chromatic.—Relating to colour; having colour: in contradiction to achromatic, which means devoid of colour.

Chromatic Aberration.—See *Aberration.*

Chromatype.—A photographic process in which the sensitiveness of copper to light is employed, in conjunction with other chemicals, to produce a picture. It is thus described by its discoverer, Mr. R. Hunt:—One drachm of sulphate of copper is dissolved in one ounce of distilled water, to which is added half an ounce of a saturated solution of bichromate of potassa; this solution is applied to the surface of the paper, and when dry it is fit for use, and may be kept for any length of time without spoiling. When exposed to sunshine, the first change is to a dull brown, and if checked in this stage of the process, we get a negative picture; but if the action of light is continued, the browning gives way, and we have a positive yellow picture on a white ground. In either case, if the paper when removed from sunshine is washed over with a solution of nitrate of silver, a very beautiful positive picture results. In practice it will be found advantageous to allow the bleaching action to go on to some extent; the picture resulting from this will be clearer and more defined than that which is procured when the action is checked at the brown stage. To fix these pictures, it is necessary to remove the nitrate of silver, which is done by washing in pure water; if the water contains any chlorides, the picture suffers, and long soaking in such water obliterates it—or, if a few grains of common salt are added to the water, the apparent destruction is rapid. The picture is, however, capable of restoration, all that is necessary being to expose it to sunshine for a quarter of an hour, when it revives, but instead of being of a red colour it becomes lilac, the shades of colour depending upon the quantity of salt used to decompose the chromate of silver which forms the shadow parts of the picture. Mr. Bingham remarks on this process, that if we substitute sulphate of nickel for sulphate of copper, the paper is more sensitive, and the picture is more clearly developed by nitrate of silver. The following modification of this process possesses some advantages. If to a solution of sulphate of copper we add a solution of neutral chromate of potassa, a very copious brown precipitate falls, which is a true chromate of copper. If this precipitate, after being well washed, is added to water acidulated with sulphuric acid, it is dissolved, and a solution formed, which, when spread upon paper, is of a pure yellow. A very short exposure of paper washed with this solution, is sufficient to discharge all the yellow from the paper, and give it perfect whiteness. If an engraving is to be copied we proceed in the usual manner; and we may either bring out the picture by placing the paper in a solution of carbonate of soda or potassa, by which all the shadows are represented by bichromate of copper, or by washing the paper with nitrate of silver. It may sometimes happen that, owing to deficient light, the photograph is darkened all over when the silver is applied; this colour, by keeping, is gradually removed, and the picture comes out sharp and clear. If the chromate of copper is dissolved in ammonia, a beautiful green solution results, which, if applied to paper, acts similarly to those just described. The chromatype pictures, under certain conditions, afford a beautiful example of the changes which take place slowly in the dark, from the combined operation of the materials employed. If we take a chromatype picture, after it has been developed by the agency of either nitrate of silver or of mercury, and place it aside in the dark, it will be found, after a few weeks, to have darkened considerably, both in the lights and in the shadows. This darkening slowly increases, until eventually the picture is obliterated beneath a film of metallic silver or mercury. But while the picture has been fading out on one side, it has been developing itself on the other, and a very pleasing image is seen on the back. After some considerable time the metal on the front gives way again; the paper slowly whitens, and eventually the image is presented on both sides of the paper, of equal intensity, in a good neutral tint upon a grey ground.

(To be continued.)

A Catechism of Photography.

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PHOTOGRAPHIC EXCURSIONS.

Q. What photographic process is most useful for taking views during an excursion?

A. The photographic processes on paper or on glass only, are really useful to travelling photographers. The dry wax paper process is excellent for this purpose: but albumen or dry collodion may be equally well employed. The principal objection to collodion is, that the weight and size of a large number of glass plates render it inconvenient; whereas hundreds of sheets of prepared paper may be carried without increasing a traveller's luggage to any great extent.

Q. What materials are really essential to a travelling photographer?

A. The necessary apparatus may be divided into three distinct parts:—1st, referring to an excursion of a few hours, or a few days at farthest; 2nd and 3rd, to a prolonged journey.

Q. What materials make up the first series?

A. The camera; lenses in their box; glass frame, or a frame of Bristol board; portfolio, for holding on one side the prepared paper, and on the other the impressions taken; a camera stand; a black cloth to put over the head in focussing; and a view-meter, used in focussing the picture in the camera.

Q. What is included in the second series?

A. Two bowls, of earthenware, glass, or wood; three gutta percha dishes fitting into one another; three gutta percha funnels of different sizes; a silver rod; waxed and iodised paper; white blotting paper; filtering paper; scales and weights; some glass plates; four camel's hair brushes; flask of aceto-nitrate of silver; cyanide of potassium; pure nitrate of silver; acetic acid; gallic acid; and bromide of potassium.

Q. What is included in the third series?

A. Negative and positive paper; white wax; solution of iodide of potassium; iodide of potassium; sugar of milk; iodine; hyposulphite of soda; and a frame for reproduction.

Q. What is the best size for a travelling camera?

A. It should be capable of taking pictures 21 by 27 inches, and be fitted with a lens of long focus. The lens should be of a diameter and focus proportionate to the size of the image; so that it is advisable to carry three or four different lenses, which may be shifted and adapted as circumstances may require.

Q. For what purpose is the glass or paper frame employed?

A. For changing the prepared paper in the open air, under a tent or curtain arranged on the camera stand. The glasses must be thoroughly clean, and well polished before starting. It is well to paste at the back a yellow paper, which prevents the action of the light, if the frame is opened during the journey.

Q. What description of portfolio is used?

A. The portfolio is made of blotting paper inclosed in a black case; on one side are placed the prepared papers; on the other, papers on which photographic impressions have been taken.

Q. What sort of camera stand should be used?

A. A stand that will fold into a convenient compass, and that will admit of the camera being on a level with the head of the operator, is all that is necessary.

Q. How is the view-meter employed?

A. It is used for fixing in an easy and accurate manner the spot where the camera should be placed for taking a large-sized view. The tube is either of copper, tin, or simply of cardboard; one end is closed by a disc pierced with a round hole, to which the eye is applied; the other end is a square opening, the sides of which are proportioned to those of the camera. The size of the opening and the length of the tube are regulated, so that, on applying the eye to the instrument, the same field is presented by that which would be received on the ground glass slide of the camera. This contrivance is found exceedingly useful to operators, and is very easily constructed.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 10, 1859.

One of the largest and finest collections of photographs in the Paris Exhibition is a series of reproductions of pictures, ancient and modern, by Signors Caldési and Montécchi, of London. Among them the most valuable and the most remarkable are fourteen photographic copies of the famous cartoons of Raphaël; some of these splendid proofs are 3½ feet long (without the frame). "The Sacrifice at Lystra," original size 18 feet by 11 feet 4 inches (photographic proof about 3½ feet long); "The Death of Ananias," "Elymas the Sorcerer struck with Blindness," "Peter and John Healing the Lame Man at the Gate of the Temple," are, perhaps, the finest. It is difficult, however, to draw distinctions between these gigantic productions. To amateurs of ancient pictures, or engravings and works of old masters, the photographs of these cartoons must be very interesting. They are colossal works of photography. Messrs. Caldési and Montécchi's photograph of "Grisi and Mario, in the *Trovatore*," taken from nature, is a good and pleasing proof. Mario's likeness is excellent.

In M. Braun's collection, which we mentioned in one of our first letters, there is a "Panorama of Mulhouse," a large view composed of three proofs, which is without a rival here, and has been universally admired.

M. Maxwell Lyte has exhibited 23 views of the country about the Pyrenees, and some other proofs besides stereoscopic slides. M. Maxwell Lyte enjoys here the reputation of a first-rate photographer. His views do him, indeed, much credit; but these proofs, taken on collodion and developed with phosphate of gold, have a black, disagreeable look about them, which we cannot term a fine tone, nor would it, in a picture, be called "strength of colour."

M. De Campigneulles' views, taken in Nubia, Egypt, &c., are extremely interesting in a geographical point of view. This Parisian photographer has exhibited nearly 40 different proofs. Such scenes as "Views of Damascus," details from "Thebes," "Mount Sinai," &c., are certainly very attractive, and cleverness of execution adds beauty of design to the interest of the subject.

The same observations are applicable to the large collection of views from the Holy Land, by Mr. Graham, of Jerusalem. He has exhibited from 40 to 50 very interesting proofs. We have, in the first place, a very large view of the "Town of Jerusalem," composed of four proofs joined together, and which is from 3 to 4 feet in length by nearly 1 foot broad. Then, another view from the "Mount of Olives," composed of 3 proofs; and, finally, 29 other partial views representing monuments, churches, and other details of the town and the country around it. Next to them are views of "Bethlehem," "Nazareth," "Rhodes," and some other very beautiful photographs of "Cairo," and the "Egyptian Pyramids," &c.

In the same manner Mr. Clifford, of Madrid, has added to the interest of this exhibition by his views of "Madrid," "Salamanca," "Barcelona," "Toledo," &c.; whilst M. De Constant-Delessert has furnished us with some Swiss views; Sig. Cuccioni, with views of Rome and its environs; Mr. Roger Fenton, with English scenery; Herr Flotwell and Herr Krone, with German sites; Sig. Naya, of whom we have already spoken, and Sig. Sinigaglia, who has given us panoramas of Venice and Milan, with Italian subjects. Dr. Lorent exhibits scenes from Algiers; Messrs. Maxwell Lyte, Civiale, and Mailand, views from the Pyrenees; M. de Nostitz, a general view of Tiflis (Caucasus); M. Piot, views of Athens, and other Grecian towns; and M. de Rumine, of St. Petersburg, has photographed the journey made last year by the Grand Duke Constantine in the Mediterranean. M. Stahl, of Pernambuco, side by side with his "Types of Negroes and Negresses," has given us 3 very interesting views of Pernambuco; and M. Varin, 11 views taken in Corsica, &c., &c., without naming a host of views of Paris and other French towns and their environs by other photographic artists.

In a future letter we intend to mention some of the *curiosities* of this exhibition.

We record with much grief the death of the illustrious Alexander Von Humboldt. A telegraphic dispatch which arrived here on Saturday last, informs us that the whole of Berlin is in mourning for this great man, who has just left us for a better world.

Alexander Von Humboldt was born on the 14th September, 1769; he had, therefore, nearly accomplished his 90th birthday. After going through the ordinary course of education at Gottingen, and having made a rapid tour through Holland, England, and France, Von Humboldt became a pupil of Werner, at the mining school of Freyberg, and in his 21st year published an "Essay on the Basalts of the Rhine." He afterwards travelled in Austria, Switzerland, Italy, and France. In 1799 he went to Spain with the intention of entering Africa from Cadiz, but the unexpected patronage he received at the court of Madrid induced him to proceed to the Spanish possessions in America. His travels in America with Boussingault (now of the French Institute) extended to 1804, during which interval he made researches in geology, botany, physical geography, meteorology, &c., which have rendered his name and his works immortal.

In 1805 Humboldt made an excursion to Naples with Leopold Von Buch and Gay-Lussac, two of the greatest natural philosophers of their day, and the succeeding twenty years of his life were spent in Paris, almost exclusively employed in editing the results of his American journey. In 1817, after twelve years of incessant toil, four-fifths of the work were completed, and an ordinary copy of the part then in print cost considerably more than £100 sterling!

In 1828 this great *savant* undertook a scientific journey to Siberia, under the especial protection of the Russian government, and in company with the distinguished philosophers Ehrenberg and Gustav Rose. The results of this expedition have been published in his "Fragments Asiatiques," and his "Asie Centrale," and in Rose's "Reise nach dem Oural."

The enormous scientific and literary productions of Alex. Von Humboldt include his—"Relation Historique du Voyage aux Régions Equinoxiales" (personal narrative, &c.); "Nouvelles Annales des Voyages;" "Essai politique sur la Nouvelle Espagne;" "De Distributione Geographieâ Plantarum;" "Essai sur la Géographie des Plantes;" "Recueil d'Observations Astronomiques;" "Flora Friburgensis subterranea;" "Essai Géognostique sur le Gisement des Roches;" "Examen Critique de l'Histoire de la Géographie;" "Atlas Géographique et Physique du Nouveau Continent;" "Monuments des Peuples Indigènes de l'Amérique;" "Tableaux Physiques des Régions Equinoxiales;" "Recueil d'Observations de Zoologie et d'Anatomie Comparée;" "Views of Nature;" and his well-known "Cosmos," which Professor Bunsen has styled "the great work of our age;" besides a number of minor works and memoirs in the "Annales de Chimie," the "Annales des Sciences Naturelles," and the "Journal de Physique," &c. &c.

"If the 'Asie Centrale,'" says Miss Otté, "had been his only work, constituting as it does an epitome of all the knowledge acquired by himself and former travellers, on the physical geography of Northern and Central Asia, that work alone would have sufficed to have formed a reputation of the highest order."

We have also to notice another great loss which science has just sustained in the person of the well-known French chemist and toxicologist, M. Lassaigne, member of the Paris Academy of Medicine, and of many other learned societies.

Our accomplished friend M. F. Pisani has lately received from Constantinople samples of a new mineral found in the interior of Turkey, and which presents rather a remarkable composition. This mineral forms large stalactites in caverns near a mine of copper pyrites; its colour is that of sulphate of copper in the parts freshly broken, whilst its crystalline form is that of sulphate of iron. On analysis it turns out to be sulphate of protoxyde of iron, in which part of the oxide of iron is replaced by oxide of copper. The figures obtained in M. Pisani's analysis lead to the formula:

$$\left.\begin{matrix}\mathrm{Fe}\\ \mathrm{Cu}\end{matrix}\right\}\mathrm{O,\ SO^3 + 7\ HO.}$$

We have also analysed this new mineral, and the results we have obtained coincide completely with those of M. Pisani. The formula given above is that of common green vitriol, in which a certain quantity of iron is replaced by copper. It is probable that the natural production in question has been formed in the waters that filter through the beds of copper pyrites, and that it could be formed artificially in the laboratory.

The celebrated Dutch chemist, Mulder, has lately made known a pretty reaction, which serves to determine the presence of glucose or fruit-sugar in a solution. He found that a solution of indigo in Nordhausen sulphuric acid is rendered colourless by glucose in presence of an alkali. The indigo blue is thus transformed into white indigo. This reaction, which takes place at the ordinary temperature of the atmosphere, is hastened by heat. The blue colour is reproduced if the solution be shaken for a little time, *i.e.*, by the action of the oxygen contained in the air of the flask; and if, instead of water, alcohol be used to dissolve the glucose, the newly formed indigo blue is deposited in a crystalline state.

This reaction of indigo does not take place with cane-sugar; hence we have in these phenomena another means of distinguishing between these two species of sugar.

M. Pierrot recommends *valerianate of ammonia* as a specific against neuralgia, hysteria, &c., but more especially as a cure for epilepsy. Valerianate of ammonia is a clear liquid of a brown colour, and has a strong odour of valeriane. (It is, therefore, an acid valerianate that M. Pierrot speaks of, for if a sufficient quantity of ammonia be added to neutralise the excess of acid, the liquid becomes one mass of delicate radiated crystals.) The ordinary dose for an adult is a teaspoonful morning and evening in sugar and water; for children, the half or the quarter.

The Society of Naturalists of Dantzic propose as the subject of a prize essay for the year 1861, the determination of the orbit of the periodic comet of Faye, the third comet of 1843, from its apparitions in 1843-14, 1850-51, and 1858. Account must be taken of the perturbations which the comet has experienced, and will have to undergo whilst continuing its course in the heavens, until its return to our part of the world in 1865-66, for which it will be also necessary to calculate ephemerides. The prize to be awarded is 711 francs; the competition remains open until the 1st September, 1860.

There is a talk at Paris of a new regulator for the electric light invented by M. Serrin, which appears to offer many advantages, but we have, as yet, no account of the construction of this apparatus. All we know of it is, that it is destined to separate the charcoal conductors as soon as they come in contact; so that no manipulation is needed to effect this.

GLASGOW PHOTOGRAPHIC SOCIETY.

To the Editor of the "Photographic News."

Sir,—Can you inform me of the doings of the Glasgow Photographic Society? What about their exhibition to take place "in the month of March?" I sent them, at their request, specimens for exhibition (I trust it is not possible that I can be promptly identified by this statement), and have heard or seen nothing of the exhibition since. Was it intended to be held on the *first* of April? Nemo.

Photographic Societies.

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Manchester Photographic Society.

A meeting of this Society was held on the evening of the 4th instant, at the rooms of the Literary and Philosophical Society. Mr. Lund in the Chair.

Mr. Mann, the Hon. Sec., read the following letters to the Society:—

"Gentlemen,—At the last meeting of our Society, I claimed for our member, Mr. Dancer, the merit of being *one of the* first to produce microscopic photographs, on account of paragraphs having lately been in the newspapers claiming for certain parties the invention, and as being something quite new. Mr. Shadbolt, the Editor of the *Photographic Journal*, has replied to my remarks, and calls upon me to give further particulars, as he has always considered himself to be the originator of microphotographs.

"My remarks are not intended to apply to Mr. Shadbolt, but as he has taken the matter up, I have no option but to reply to his letter; and now claim for Mr. Dancer, not that he was '*one of the first*,' but *the first* who produced these photographs.

"I repeat, then, that I have two specimens of microscopic photographs, given to me by Mr. Dancer, in the spring of 1853;

they are mounted with Canada balsam, as microscopic objects, on the ordinary size of microscopic glasses. I may also say that Mr. Dancer at the time informed me how they were taken, and in the autumn of the same year, I followed his instructions, and (although not very successfully) I produced some of these minute photographs, and have them still in my possession.

"That there may be no mistake in the dates, I inclose two letters, one from Mr. Dancer, the other from Mr. Binney, confirming my statement. "JOSEPH SIDEBOTHAM.

"*May 4th*, 1859."

"*Manchester*, *May 2nd*, 1859.

"MY DEAR SIR,—I duly received the letter in which you call my attention to an article on the 'Origin of Microscopic Photographs,' by Mr. Shadbolt, printed at p. 104 of the May number of our Society's journal; and as Mr. Shadbolt requests you will read his communication to the Society, I must beg as a favour that the members present will listen to the contents of this letter, which shall be as brief as possible, and accept an apology for occupying their time with a matter so purely personal. The question at issue between Mr. Shadbolt and myself is simply this:—Did I produce microscopic photographs before March, 1854? In reply I can state that even on collodion I had produced microscopic photographs in February, 1852; I named these minute pictures microscopic photographs, and this name I still employ. The word micro-photograph I have no claim to whatever. As the monumental tablet to Mr. Sturgeon was raised in your statement to the Society, and is also alluded to by Mr. Shadbolt, I will confine my remarks more especially to it. The tablet in question was photographed on the 25th April, 1853, and reduced for the microscope early in the following month. Some of the early specimens were presented to E. W. Binney, Esq., F.R.S., F.G.S., &c., of this town; S. Salt, Esq., now of Westport, Ireland; S. W. Williamson, Esq.; A. Neild, Esq.; two of our own members, and yourself. This and other microscopic photographs were well known in this locality, long before they had been supplied by me to dealers in such articles; but when they first reached London I cannot say.

"I do not for one moment suppose that Mr. Shadbolt was aware of their existence previous to his own production. To remove all doubt as to the accuracy of the foregoing dates, I inclose a copy of a letter which I have this day received from E. W. Binney, Esq.; this letter relates especially to the tablet in question, and it, in addition to your own testimony, will, I hope (as regards the question of dates), be satisfactory to Mr. Shadbolt.

"I cannot conclude this letter without expressing my great surprise at a statement which appears in Mr. Shadbolt's paper, the substance of which is as follows:—That about March, 1855, Mr. Thornthwaite showed to him a copy of Sturgeon's tablet, which Mr. T. alleged to have procured the production of, in consequence of what Mr. Shadbolt had shown to him. No doubt this has been some misinterpretation, which Mr. Thornthwaite will be able to explain in a satisfactory manner.

"I regret that your friendly feeling should have involved you in this controversy.—Yours very truly, "J. B. DANCER.

"Joseph Sidebotham, Esq."

"*Manchester*, *May 2nd*, 1859.

"MY DEAR SIR,—On referring to my papers I find that it was in April, 1853, when Dr. Joule, F.R.S., myself, and another, got the tablet in memory of our old friend the late Mr. Wm. Sturgeon, executed by Mr. Latham, sculptor, Manchester. On Saturday, the 23rd of April, I took you to Mr. Latham's place, then in Portland-street, to look at the tablet, and when there requested you to photograph it for me before it went to Kirby Lonsdale to be put up in the church. On that same day, Mr. Latham, by my orders, took the tablet up to your house in Ardwick. It came back to his place in the early part of the following week, and on Thursday, the 28th of April, it went off to Kirby Lonsdale, and was placed in the inside of the church there. Within a month of the last named date, in the end of May, 1853, you presented me with a micro-photograph of the tablet, which I received with much gratification and surprise, having expected only a common, and not a micro-photograph from you. I most certainly never gave Mr. Thornthwaite, or any other person, liberty to photograph the tablet; and Mr. Latham assures me that no one but yourself had any opportunity to take a photograph of it prior to its going to Kirby Lonsdale. Believe me to remain, my dear sir, yours truly,

"EDWARD WM. BINNEY.

"J. B. Dancer, Esq., F.R.A.S., Manchester."

Mr. Wm. Crookes, the Editor of the "PHOTOGRAPHIC NEWS," was elected an honorary member of the Society.

The Honorary Secretary stated that Mr. Crookes had sent the 1st volume of the "PHOTOGRAPHIC NEWS" for presentation to the library of the Society; also a print of his magnified photograph of the Moon, for the Society's portfolio. A vote of thanks was unanimously passed to Mr. Crookes for his presents.

A vulcanised rubber tray, made by Messrs. Macintosh and Co., at the suggestion of Mr. Sidebotham, was shown to the members.

Two large and exceedingly beautiful prints, from collodio-albumen negatives, were presented to the Society's portfolio, by Mr. Lund. A very compact exposing camera was exhibited by Mr. Mudd.

Mr. Norton exhibited his contrivance for beating up albumen, and beat up a quantity of albumen in a few minutes into a very solid froth. The apparatus was highly approved of by the members, effecting the object in a most satisfactory manner and with very little trouble. A vote of thanks was unanimously passed to Mr. Norton, for having exhibited the working of the apparatus to the society.

Mr. Higgins exhibited some sensitised papers which had been kept a month in one of Mr. Mudd's boxes, and which had remained quite white.

Mr. Mudd exhibited one of the boxes contrived by him for the purpose, and explained the same to the members.

Mr. Mabley exhibited some sensitised paper which he had kept white for sixteen days, simply in an ordinary drawer, with some chloride of calcium. It was stated that the chloride of calcium would do over and over again, if dried when damp.

Mr. Mudd said that he intended to make a box for keeping collodio-albumen plates with the aid of chloride of calcium; and it was generally thought by the members that by such a plan the collodio-albumen plates might be preserved longer than it is at present possible to keep them.

Thanks were passed to Mr. Lund for officiating as chairman, and for his donation of the photographs to the Society's portfolio, when the proceedings closed.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

A MEETING was held on Monday, May 10th, at the library of the Walworth Literary and Scientific Institution, to take preliminary steps for the formation of the above society. Mr. A. H. Wall being voted to the chair, that gentleman proceeded to explain his views in organising the present meeting, and suggested such matters as called for immediate discussion.

Mr. G. Shadbolt proposed—"That the present meeting constitute the South London Photographic Society as an independent body. That the subscription be half a guinea annually, and that members of the Walworth Literary and Scientific Institution be admitted as members of this society, upon payment of an annual subscription of six shillings." Mr. Harvie having seconded this motion, it was carried.

Mr. W. Ackland proposed, and Mr. J. Howard seconded—"That this society hold monthly meetings (with a recess), organise an exchange club, supply a journal periodically as published, and present a photograph annually to each member of the society, when a sufficient number of members shall have raised the necessary funds." Mr. Ackland's motion was then carried.

Mr. Shadbolt proposed, and Mr. Ackland seconded—"That eight or nine meetings be held during the year, and that ten shillings per evening be offered for the use of a large room behind the Lecture-hall, Carter-street, Walworth, for meetings to be held on the second Thursday in each month, if confirmed by the next meeting." Carried.

It was then proposed by Mr. J. Howard, seconded by Mr. Luke, and carried—"That the first public meeting of this society be held at eight o'clock on the evening of the second Thursday in June next, in the room adjoining the Walworth Lecture-hall."

It was moved by Mr. Armstrong, seconded by Mr. J. Heod, and carried, that ladies be eligible as members.

It was also proposed by Mr. Armstrong, seconded by Mr. Shadbolt, and carried unanimously—"That the following gentlemen be appointed a provisional committee for the formation of the society, viz., Messrs. Ackland, Cotton, Harvie, Howard, Luke, and Wall." Messrs. Rogers and Stevens took an active part in the discussions, and the meeting terminated at a late hour.

Miscellaneous.

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Action of Lunar Light.—Of all known substances chloride of silver is that which alters most strongly and rapidly in colour under the influence of solar light. Nevertheless, observations of old date seemed to have proved that a layer of this chemical compound, exposed for a great length of time to the action of moonlight, not in its ordinary diffused state, but concentrated by means of an immense lens, lost nothing of its primitive whiteness. But since the discovery of Messrs. Niepce and Daguerre photographers have had at their disposal a goodly number of highly sensitive chemical compounds, which are readily acted upon by the lunar rays, and photographic images of our satellite can be easily obtained, as I prophesied would be the case so long ago as 1840. One cannot find, therefore, in comparisons of this kind, the proof that the darkening of the skin cannot be attributed to a direct action of the lunar light; hence I am afraid to entirely deny the correctness of popular observation. The way in which I think it may be accounted for, without having recourse to a chemical action, the intensity of which is certainly very trifling, is as follows:—When we receive the light of the moon on the face, the sky is clear; when the sky is clear there is a radiation of heat from all parts of the skin exposed to the atmosphere, and the necessary consequence is a notable lowering of the temperature of those parts. The skin exposed to the lunar rays would apparently, as in the case of inanimate substances under identical circumstances, be reduced to a temperature from 6 to 9 degrees below the temperature of the air. It is true that the animal heat arrives every instant to the face, so as to diminish, if not entirely make up, the deficit arising from the radiation. It is likewise true that the skin is scarcely ever cooled to such a point that dew will form upon it; nevertheless, who can affirm that the physical conditions in which the epidermis is placed by a very intense local cold may not alter its texture, or modify its tint? The tan of the bivouac—this tan which manifests itself exclusively on severe nights—does it not appear as if it could only be considered as the effect of radiation from the skin? We see that, by this hypothesis, the moon exercises no kind of action in the production of these phenomena; she simply indicates a clear sky. There is a proverb current in the south of France to the effect that exposure to the night air on a clear night darkens the skin.—*From Vol. V. of Notices Scientifiques.*

Photographic Notes and Queries.

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CAUTIONS TO BE ATTENDED TO BY PHOTOGRAPHERS.

Success in photography depends so much on a close attention to the "thousand and one" niceties of manipulation, that the writer has thought a series of *cautions* on the points most productive of failures may be likely to prove of material use to those who are desirous of acquiring skill in this most fascinating art. His own knowledge of it has been obtained from the best of all teachers, experience, and he is desirous that others should be saved, at least, some of the labour and annoyance that he has himself had to undergo. The following observations are more especially intended to apply to the paper processes, but some of them will be found equally useful to the practitioner in albumen or collodion:—

1. A scrupulous attention to cleanliness is essential in all photographic operations, and without it *failure is certain.*

2. Carefully exclude *all* white light from the operating room, covering the edges and bottom of the door with broad list, and stopping the keyhole (if there is one). The neglect of this is productive of uncertainty, and imperfections of various kinds.

3. If a strong light falls on the window, do not trust to yellow *calico* for a blind, as it will certainly fade. Yellow *paper* will retain its colour, and answers well. A few thicknesses, pasted on a frame, and hinged to the window, will allow of the daylight being admitted when requisite, and will be found convenient.

4. Avoid having, or causing, dust in the room when at work. To secure this it should be swept at times when it will not be required for some hours; and, at all times, as little stir must be made in it as possible.

5. Keep always ready a sufficient number of *thoroughly clean* cloths, and apply each to only one purpose; arranging them so as to be readily distinguished and found in the dimmest light. Two or three old and soft silk handkerchiefs and a piece of wash-leather (all, of course, clean) will also be found useful.

6. Be careful that all blotting paper used in the progress of a picture is quite clean. The smallest stain will be productive of mischief if it come in contact with a sensitive surface.

7. Keep all solutions containing gold or silver in a small dark closet in the operating room, as they are always liable to injury from exposure to the light.

8. Every bottle should be distinctly labelled. It is useful to have them of *various* shapes and sizes, as when working almost in darkness they are more easily distinguished, and thus mistakes are less likely to occur. The latter caution is also useful with glasses.

9. When slops occur (as they will do) on the work-table, they should be, as soon as possible, wiped up with a cloth or sponge, kept especially for the purpose; and the hands, when soiled or wetted, should be immediately wiped, and, as early as convenient, well washed.

10. Filter all solutions, immediately before using them, through a new filter of fine white blotting paper.

11. Clean all dishes, glasses, &c., as soon as possible after using them. If this cannot be done immediately, much subsequent trouble will be saved by filling them with water, and letting them remain so till they can be cleansed.

12. Dishes used *only* for exciting the papers are easily cleaned by a brush and water, with an occasional use of cyanide of potassium, as stated below.

13. Those used for developing require more care. They should first be well scrubbed with a brush and water, especially the corners, and when *apparently* clean, a little solution of cyanide of potassium (10 grains to 1 ounce of water, but the strength is not material) should be poured into them, and the brush again used vigorously. If already clean this will remain colourless, but if otherwise it will become *red.* In this case a second quantity should be applied, which will, by remaining colourless, show them to be chemically clean, and a rinsing with hot water will fit them for use. When again required, rub them well with a clean linen cloth, and take care that no dust or other matter remain upon them.

14. Be careful to employ none but perfectly pure chemicals, which it is easy to do by purchasing only from really respectable dealers.

15. Never open bottles containing strong acids or ammonia whilst operating, as the vapours are injurious to the work, and whenever used, the room should be afterwards well ventilated.

16. If any solutions require to be evaporated, it is best done out of the operating room, as the vapour may cause injury, and will certainly produce dampness. Aliquis.

SENSITIVE PLATES AND THE CUSTOM HOUSE.

Sir,—Respecting your correspondent's inquiry as to the examination of sensitive plates, I am enabled to inform him, that on landing last summer at Antwerp, I had a great deal of trouble about them. The authorities of the *douane* seemed not to know what to do, and I was referred from one to the other, all insisting on having them opened, which of course I did not agree to; so at last the highest *chargé* on board, Monsieur le vérificteur, decided that I should pay the duty, which was to be something like 16 francs, for a quarter-plate lens, a small camera, and two dozen plates. Having nearly given the whole affair in charge of the captain to take them back to England, I tried as a last chance to propose to the custom-house officers to have them forwarded *in transit.* to Germany. After a deal more bother, they consented to this, and having almost missed the train, off I started at last, having the pleasure of the company of one of the douaniers through the town to the railway station. Coming to Cologne, they began to make the same fuss about it, but after convincing them by rattling the boxes that they only contained glass, it was settled to let them pass unopened, by paying the duty chargeable for coloured glass, which amounts to about 18s. per cwt., so that I came off with about one shilling for duty on glasses and the whole of the apparatus. Coming back to England, the custom-house officers are generally satisfied if they see the name of an English maker either on the lens or any other part of the apparatus.

It would be a good plan if the manufacturers of the different sensitive plates would give a translation of the directions they generally paste on the boxes, both in French and German. E. S.

THE HONOURABLE MAJOR FITZMAURICE'S NEW LIGHT.

Sir,—Some months ago I saw in the "Photographic News" a request for information concerning the Hon. Major Fitzmaurice's new light; I now send you the enclosed paragraph which I cut from the local paper:—

"The New Gas Light.—On the evening of the 3rd inst., the Hon. Major Fitzmaurice, who for some time past has been visiting Bournemouth, exhibited at the Belle Vue Assembly Rooms and openly in the town his *Grand and Domestic Lights*, the power of which promises to out-distance the lighting power of our present ordinary street gas, as much even as that gas surpassed the old oil lamps. At the Assembly-room the 'domestic light' was exhibited, a single burner of which, fed from a portable cylinder of compressed gas, instantly made the ordinary lights that surrounded the room appear so dull and opaque by comparison that it was quite immaterial whether they were put out or kept burning, so unappreciable was their contribution to the intense and yet not over dazzling light given out by the new gas. Major Fitzmaurice has for some years past devoted his attention to the subject of the improvement of gas, and it has long been a favourite subject of investigation and research amongst the scientific how those intense lights known as the Bude and the Electric could be obtained, not merely as illustrations of experimental philosophy for the Polytechnic and lecture-room, but by means economical, safe, and certain, failing which, our present discoveries beyond common gas have resulted only in brilliant experiments. After many years of application Major Fitzmaurice has succeeded in obtaining an improved gas, and this discovery is now protected by a patent and ready for being practically applied to the lighting of towns, and, in fact, threatens to supersede altogether the present obnoxious gas obtained in the usual method from coal. We gather from the explanatory remarks made by the Major at the Assembly-rooms, that the following are the grounds upon which the superiority of the new gas is asserted. It is free from the deleterious acid by which common coal gas affects *the atmosphere so much*, so rapidly corrodes gilding and painting, and proves prejudicial to the health of those who breathe the air impregnated and vitiated by it. It gives superiority of light both as to intensity and freedom from colour, being three times the power of ordinary gas; and this not by rough estimation, but by the most accurate test. Singular it is, too, that the heat is almost inversely as the light —that is to say, while there is three times the amount of light, there is scarcely more than one-third the amount of heat. The gas can be manufactured from oil, fat, or coal, at a very considerable saving as compared with common gas, so that while one burner will supply the place of three, or be reduced in size so as to consume only one-third the amount of gas, if giving the same amount of light, the economy becomes very great, while the advantages in a sanatory point of view are of themselves sufficient to give it precedence of common gas. The 'grand light' as distinguished from the 'domestic' is effected by means of two improved gases, united only at the instant of lighting, and further aided by the application of lime at the moment of combustion. The intensity of this is identical with the electric light, and further aided by reflectors is about to be extensively used for lighthouses and similar purposes. As a substitution for the common coal-gas, the domestic light, as witnessed at the Assembly-rooms, certainly justifies all the notoriety it has won for itself in scientific circles, and there appears to be every prospect of it being at no distant day in common use, and supplied by gas companies generally instead of the present deleterious gas. The effect of the grand light projected by means of a reflector is almost incredible; a watch or newspaper may be read at the distance of half-a-mile, while the light itself is so perfect as to render the nicest shades of colours as discernible as by the open day. The exhibition of the light brought together a larger assembly and public gathering than Bournemouth ever before produced, and some expectation is raised that Bournemouth may be the first town to apply this powerful light to ordinary domestic purposes and street lighting. The gratification of the inhabitants generally, and the very large numbers who 'turned out' to witness the light, was an expressive vote of thanks to the Hon. Major for the favour thus shown them."

I was not able to attend the major's lecture, to which the public were invited, but I can state from my own observation that the light is most intense. The grand light is the same gas as the domestic, aided by a jet of oxygen playing on a cylinder of lime about 2 inches long, and 1 inch in diameter, placed in front of a concave reflector about 18 inches in diameter; the distance at which a letter can be read is incredible. The light makes colours very vivid, considerably more so than daylight; I never saw so magnificent a green as the trees appeared when the light was thrown on them. The domestic light is the light for lighting streets, &c., as the grand light is too partial, and where you are out of the line of light, you are in the dark and there is no mistake about it. It is quite possible to pack the grand light in a portmanteau; the domestic is the size of a moderator lamp.

Arthur W. Blacklock.

Bournemouth, May 9th, 1859.

THE RASPBERRY SYRUP PROCESS.

Sir,—In reply to your correspondent, J. C. S., who wishes to know how I made the raspberry syrup process answer, I can only say, that I implicitly followed the directions given in the "Photographic News" of the 19th November last, using, at that time, a double combination portrait lens with half-inch stop, on a very bright day, in 35 seconds, for copying the engraving, and gave a few seconds more for a landscape. Since that time I have found that the *same* syrup bath has very much deteriorated, and the exposure required amounts to more than four times its length. I have therefore made a new syrup bath; and the two enclosed positive prints are from negatives taken last week with a caloscopic lens, 15½ in. focus, in 3½ minutes.

It appears to me, that the syrup requires to be new, and perfectly free from all acidity which might arise from fermentation or otherwise; as, although I kept a piece of camphor in it, it appears gradually to lose its preservative power. M. P. M.

PHOTOGRAPHIC NOTES.

Sir,—Have any of your readers tried to increase the sensitiveness of waxed paper by the use of chloride of ammonium, as a wash (say 5 grains to the ounce of water and sugar of milk) before or after the silver solution has been used? Mr. Raven's process answers very well, but the exposure required is long. The paper waxed by Sisson's process, with one-half of the castor oil he uses mixed with the wax and turpentine, enables paper to be very easily and evenly waxed.

Would MM. Desprets or Foucault have had the sensations of a sun stroke from Bunsen's pile if their faces had been protected by a yellow covering?—"Photographic News," p. 93. T. F.

MODIFICATION OF THE FOTHERGILL PROCESS.

Sir,—Through an error of mine, my letter on the above, at p. 88, is left incomplete, by the omission of the words "of prepared albumen."

The part referred to should stand thus—"which is simply the substitution of thin mucilage * * * * *for prepared albumen.*" Your insertion of this will oblige, as I find many of your readers are, as might be expected, at a loss to understand what the mucilage is substituted for.

As I have inquiries respecting it. I may also here add, that the plates require washing equally well when mucilage. as when albumen is used. Alfred Keene.

ANSWERS TO MINOR QUERIES.

Instrument for Counting Seconds.—*Camera.* One of the simplest contrivances for counting seconds, is to be made by hanging a bullet at the end of a thread, 39 inches long, and setting this to swing as a pendulum; it will keep oscillating for upwards of a minute, and will be found very useful if kept permanently hanging in a convenient part of the glass room. If the silken thread, with the two bullets attached to it, recommended for levelling the camera in our last number, be made 39 inches long instead of 3 feet, it may also be made available for this purpose, by suspending one of the bullets by means of a small hook, and letting the other hang down freely.

Development of Calotype Negatives.—*O. A.* An American gentleman, Mr. Hazel, has found, that the admixture of one-half of gum water, with the gallic acid solution used for developing calotype negatives, much improves the resulting picture, as it prevents the image from appearing so sunk in the pores of the paper. Possibly this addition will be found to remove the wooliness of which our correspondent complains.

Sensitiveness of Chloride of Silver.—*A Young Chemist.* When it is said that chloride of silver is sensitive to light, it is always understood that the chloride spoken of has been prepared in the *wet* way, *i. e.*, by precipitation from a solution. Dr. Percy, one of our most eminent English chemists, has placed it on record that chloride of silver, prepared by the direct union of chlorine gas and silver leaf, underwent no darkening whatever, even when fully exposed to sunlight; and a specimen had been kept, for some months, fully exposed to light *in common air*, and yet no darkening whatever took place. The same high authority has also stated another curious fact. A little chloride of silver was placed in a small glass tube; chlorine gas was then introduced, and the tube closed. When the instrument was exposed to the light, a certain degree of darkening took place within a given time; and, when removed into the dark, the chloride of silver assumed its original whiteness, and, at the same time, its sensitiveness to light. If we are correct in supposing that the chloride of silver used in this second experiment was prepared in the wet way, this would point to a very radical difference in the molecular constitution of these differently prepared chlorides; for, whereas chloride of silver, prepared by the direct combination of its elements, refused to darken in the sunshine in the ordinary atmosphere, chloride of silver, prepared by double decomposition in the wet way, darkened even in an atmosphere of chlorine.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

A. C. S.—The cause of the red and green marks which appear on your pictures after varnishing, depends upon the varnish leaving too thin a film. Some varnishes are very liable to produce these iridescent marks; but they can generally be avoided by not pouring the varnish off so rapidly, and thus leaving a thicker film on the plate. You will not find these colours interfere with the ordinary process of colouring the picture, either with powder colours or otherwise, as the iridescence is too delicate to show through any colours which may be applied over the varnish.

Antwerpia.—1. We know of no other method of giving transparency to calotype negatives, besides the ordinary plan of waxing them. 2. The cause of the minute brown spots which appear on your paper negatives is, the nitrate of silver coming off the surface of the positive paper, and adhering to the surface of the negative. They may be avoided by having the positive paper quite dry, and just before using it gently rubbing the surface with a soft and clean cambric handkerchief.

J. Herdmans, Junr.—Your picture is an excellent one; and we shall be happy to insert your name on our next list. We are pleased to hear you have been so successful with the Fothergill process.

Norwood.—There must be something radically wrong with your chemicals, as your exposure is at least ten times the usual time; but as you give no details respecting the way the solutions work, we cannot advise you how to remedy the fault. Use a nearly neutral bath, and add to it a few grains of acetate of soda.

F. A. Borrell.—See answer to Mr. Jackson in our last number.

D. Storrar, Junr.—Received.

An Unfortunate Tyro.—The blueness of your glass positives may arise from the collodion being too thin, or the exposure being insufficient. Try the effect of adding a few drops of the nitrate of silver bath to the developing solution before pouring it on the plate; and do not work with a bath more than faintly acid with acetic acid.

Billet.—An imperial gallon of water weighs exactly 10 avoirdupoise pounds, or 70,000 grains, when the barometer stands at 30 inches, and the thermometer at 62° Fahrenheit. From these data, you can easily calculate the weight of any fraction of a gallon.

Inquirer.—We do not know the address of the "Metropolitan Water Glass Company," or we would inform you. We should be glad to hear in what way you propose to render "Water Glass" serviceable to photographers. It possesses many valuable properties, and we think that a few experiments on the subject would be well rewarded, as there are few substances better adapted for the production of a hard and durable glaze.

Photo-Fothergill.—After long using the second bath will increase so much in strength as to render dilution necessary. The amount of silver present in it should therefore be tested from time to time by the process of argentometry, which we gave in our first volume.

T. G.—1. A whitewashed background is very bad; you will never succeed in taking as good pictures with it as you would with one of a darker colour. 2. Employ the cyanide in a more dilute state, and wash the pictures well after fixing. 3. Expose the bath to the sun for a few hours; then filter, and acetify if necessary.

C. S. K.—We cannot understand your description sufficiently to give you much assistance. You must push in or draw out the ground glass, until the image appears most distinct.

F. L. G.—Received with thanks.

B. Pierce.—The bath and other solutions should be prepared exactly as Mr. Keene recommends. Fix with 4 ounces of hypo. to 12 or 16 ounces of water.

A. G. G.—1. According to Mr. Lyte's experiments, a nitrate of copper bath would be injurious to silver prints. 2. It is best to tone before fixing. 3. Marion's paper is preferred by many. 4. Each paper process possesses special qualities, which recommend themselves to different persons; we therefore cannot say which is the best. 5. Use bromide of cadmium. 6. Ammonia does not fix prints so perfectly as hypo. 7, 8, and 9. We cannot speak from experience on either of these points.

J. H. B.—Add about one tenth of a grain of bromide of cadmium to each ounce of collodion; this will remedy the solarisation of which you complain.

J. H.—We think the lens you have called No. 2, is decidedly the best of the two.

V.—Received with thanks.

J. P. P.—We can suggest no better remedy than adding a few drops of nitric acid to your developing solution; and if that does not prove an effectual remedy, to the bath.

J. W. W.—1. We prefer a twin lens camera mounted on parallel laths. 2. We will insert the query. 3. We would rather not interfere in the matter beyond inserting the names and addresses.

F. A. W.—We cannot help you. You got into the difficulty with your eyes open, and in direct opposition to our express advice; and you must now get out again as best you can.

Hyposulph.—Add one drachm of absolute alcohol to each ounce of your collodion.

Chirurgus.—If you place a piece of camphor the size of a pea into the filtered albumen, it will keep good for some months.

Dilemma.—The gradual accumulation of acetate of soda in your bath has thrown it out of order. You will not succeed satisfactorily now, unless you make a new bath.

R. Gordon.—The discoloration is owing to the print not having been sufficiently exposed to the action of the hypo. or the toning bath. The margin of the print has been soaked sufficiently, but the centre, where the spottiness is, has been, probably, protected from the proper action of the liquid by contact with another print, or by being partially elevated above the surface of the solution by an air-bubble underneath.

P. S.—1. Free exposure to warm dry air is the only means of getting rid of the smell of a newly varnished box. If the wood is sufficiently well seasoned, placing it in a rather cool oven for a few hours may prove of use. 2. Carbonate of soda is better than ammonia for neutralising an acid toning bath. 3. An ordinary ¼-plate lens will answer very well for a magic lantern. Place it in the same position as the other lenses were, and at a distance from the slide a trifle longer than its focal length; and, finally, adjust it by trial.

Ignoramus.—To answer such very elementary questions in sufficient detail to be of service, would occupy far more space than we can spare. You had better consult some elementary work on photography.

One Perplexed.—No such process has yet been brought to sufficient perfection to be of practical use. Try one of the well-established dry processes.

T. T. H.—Your letter has been forwarded to the proper address.

Communications declined with thanks:—D. G. P.—T. T.—Forth.—A. S. F.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—P. C.—T. N. L.—An Amateur.—T. H. R.—X. T. R.—Tyro.

In Type:—T. A. Malone.—C. Heisch.—Evargrab.—A Kerry Man.—Viator.—T. Millard.—J. W. W.—W. A. Young.—H. S. L.—J. B.—W. W. Hughes.—N. T. A.—H. E. Jennings, junr.

Erratum.—In vol. ii. p. 98, the formula for the fixing solution should be, "cyanide of potassium, 12 ounces; water, 2 quarts."

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 37.—*May* 20, 1859.

THE PRESENCE OF OXALIC ACID IN COLLODION.

Those who took the trouble to read our report of the discussion at the Photographic Society, which we gave in our last number but one, p. 104, could not fail to be struck with the remarkable fact, announced by Mr. John Williams, of Cavendish Street, viz., that from twenty Winchester quarts of collodion residues he had obtained sufficient oxalic acid to yield no less than 1 pound 5 ounces of oxalate of lime. In conversation afterwards we found that this was regarded as quite a new fact; and as it was generally allowed to be of the greatest interest, we think that the following account of some experiments by M. De la Haye, bearing on this subject, which were communicated by him to a foreign contemporary some time ago, will prove interesting to our readers. He first directs a collodion to be made of 100 parts of pure ether, sp. gr. ·847, and 4 parts of well-made gun-cotton. (It is a pity that the author does not enter into more detail on the manufacture of this gun-cotton, as on this, we think, the whole question turns.) The mixture is placed in a conical vessel to facilitate precipitation, and well shaken during the first few days, after which it must be allowed to remain at rest for about three weeks. At the end of this time three distinct strata of the liquid will be apparent, each differing in density. The uppermost is composed of a perfect solution of pyroxyline, having the colour and consistence of very white albumen. The next layer is thick, and contains pyroxyline only partially dissolved. The lowest and densest layer consists of a small portion of dissolved pyroxyline, a large quantity of unchanged cotton, and impurities. This layer has not the properties necessary for photographic collodion; it contains several salts, held in suspension by the more or less azotised fibres, or supplied by the re-action of the ether.

The two upper portions of fluid must be poured off carefully, and one per cent. more pyroxyline added, when a rather curious phenomenon presents itself. The ether, finding new gun-cotton to dissolve, abandons the fibres it had only swelled and held in suspension; hence it results, that the precipitate of this second operation is proportionally greater than that of the first, and slightly different in its nature, being more dense and felt-like. It is probable that among these fibres a portion may be changing to oxalic acid, or, at all events, have commenced this transformation. It is certain, however, that under the influence of various circumstances, *the deposits of old collodion, when greatly concentrated, and treated with potassa, yield perfectly defined crystals of oxalate potassa.*

After standing fifteen days the fluid must be decanted, and mixed with an equal quantity of distilled water to wash the collodion. The mixture must be long and well shaken, and then left to subside for a month or six weeks. Two layers are formed, and a singular fact presents itself—the collodion is thicker than before. This may be due to the absorption of 1 part of ether by 10 of water, or to a certain combination of the two bodies; there is the fact, and the first hypothesis is the simplest explanation of it, though it does not quite account for the increase of density being considerably more than one tenth. (This would be accounted for, by taking into consideration the absorption of water by the ether.) A second phenomenon is also worthy of notice, the layer of water is acid, while the collodion is absolutely neutral; the water evidently deprives the collodion of its soluble salts, and carries all the remaining impurities to the bottom. The washing gives to the ether perfect neutrality, and relieves it of the acetic and nitric acid, &c., which it may contain, and imparts to it new properties.

Collodion prepared in this manner, if allowed to stand for six months, acquires a perfect limpidity, and forms no deposit. Age perfects it. It would seem as if the pure elements of which it is composed united together more intimately.

This collodion, it will be remarked, contains no alcohol, which accounts for its great tenacity on glass, and, also, for its non-destructive action on the silver bath, which, once saturated with the small portion of ether which water can absorb, retains no more. It is quite otherwise with collodion charged with alcohol, which, at each immersion, adds something new to the bath; so that after a number of collodionised plates are immersed, the alcohol reacting, and, perhaps, decomposing under the influence of the chemical transformation effected by its presence, causes the bath to excite the plate with difficulty, and acquires a great tendency to produce foggy pictures on development.

Old silver baths give rise to a peculiar needle-like crystallisation on the layer of collodion—a compound precisely analogous to oxalate of silver; and, on analysing the bath, more or less abundant traces of oxalic acid are found. Oxalate of silver is a salt sensitive to light, and very much more sensitive in the presence of an excess of nitrate of silver; its presence therefore, as a reducible salt in the nitrate bath, is to be feared, inasmuch as it is more than probable that it is to its mixture with the iodide of silver that the veil is owing, which, in such cases, covers part or all of the pictures.

PHOTOGRAPHY IN THE CAMP.

It appears that several months since photographic apparatus was sent to the Artillery in garrison, at Versailles, with proper persons to give instruction in the art. Laboratories were established, and good progress made by the military students in its practice, some of the prints they turned out being very creditable specimens of photography. The scene of their labours is now transferred to the plains of Italy, the Emperor being desirous of possessing pictures of those fields of action in which he so confidently expects to be victorious. There is thus a possibility that they may accomplish, on a more extended scale, that which our correspondent in Algeria has done on a lesser, and give to the world representations of a field of battle as it actually appears during an action.

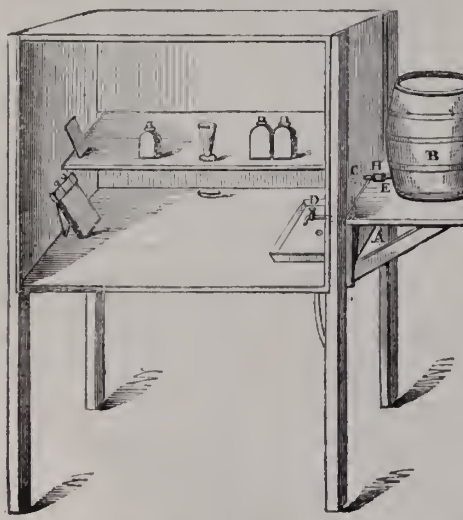
We have also received a letter informing us that experiments had been made, within the last few days, by some officers at Grenoble, with the view of testing the practicability of a suggestion put forth by us, and translated into the foreign papers, relative to the employment of micro-photography in transmitting despatches from one part of an army to another, between which the communication is excessively dangerous or absolutely impossible. In the experiments alluded to, an imaginary despatch, containing fifty-two words, was written on a strip of thin paper in very small letters, and as closely as possible; this piece of paper was then rolled up tightly, and deposited in a conical ball, which had been hollowed at the core to the required depth. The open end was stopped up with wax, and the ball forced down into a rifle in the ordinary manner. Some thick planks were then reared on end, in the road which ascends the hill on which the fortress is built, and the bullet was fired into them from a distance of 150 mètres, after which it was cut out and examined, when it was found that though the wax had been forced against the outer edge of the despatch in such a way as to glue the edges together, yet this was readily removed with a penknife, and the despatch itself was uninjured. This method of writing the despatches, instead of employing micro-photography, is so far an improvement on our suggestion, that it can be adopted under all circumstances, whatever the state of the weather may be.

A SIMPLE DARK ROOM FOR WORK NEAR HOME.

Many persons busy themselves with the construction of intricate and expensive *dark rooms* for out-door work on their own premises, when a far cheaper substitute can be provided with little trouble.

I have myself adopted a very simple plan (I say *adopted*, for, though I have never seen a similar contrivance, many, no doubt, have ere this carried out the same or a like design); and my plan has the advantage of being sufficiently practicable for use in the house or garden. I construct my "dark room" as follows:—

Procure a box about three or four feet square (never mind how roughly made, so that the panels fit *closely*)—a large tea chest would answer admirably—cut out at the back or left side the space for a window, six inches by four, and glaze with deep yellow or orange glass, and stop up all cracks in the top, bottom, and sides of the box with putty or marine glue. (If for out-door work the waterproof properties of the latter render it more desirable.) Next either attach legs to the box by nailing them to the side, or provide a stand or bench, and, if thought necessary, give the embryo room a coat of paint. It would be well, under any circumstances, to paint or stain the interior black.



A shelf at the back of the box, should be added, as extremely useful for holding collodion and solution bottles, &c. A gutta percha sink should be placed on the right hand side of the box, the waste-pipe of which, passing through the bottom to the ground, may be made of gutta percha or India rubber tubing, though should the dark room have *fixed* legs, a metal pipe passing down one of those legs would be preferable, as less likely by its firm position to splash the clothes or be injured.

A dark curtain to exclude the light when operating should next be made, and had better be constructed of black glazed calico, lined with yellow, and so broad that when fastened to the top and sides of the box (*not the legs*) it will allow the operator to gain access to and leave the interior of the "room" without admitting light. It would be well to nail a piece of black or yellow calico down the front legs of the "room" to guard against the possibility of light entering from the rear.

The dark room is now complete, and all that remains is to introduce the bath, &c.

One hint more may be acceptable, and that is, how to obtain a good and convenient supply of water.

My suggestion is as follows:—In the first place, the water can be supplied from the sides or top.

If the "room" has fixed legs I recommend a supply from the side. The sink being placed to the right of the room, about two-thirds of the way up the outer "right" side of the box fix a bracket A, and on it place a small barrel B; in lieu of a tap fix a piece of metal tubing E, extending one inch from the barrel—a pipe C should be fastened to the interior of the room, also on the right side, so contrived that a tap D attached to the lower end shall drain into the sink and be nine inches or a foot above it. The upper end of the pipe must pass through the side of the box, just above the bracket, and project an inch, and can be connected with the branch-pipe by means of a piece of India rubber tubing. Fill the barrel with water, and a good supply will be at the photographer's disposal.

With these directions there will be no need to explain the mode of obtaining water from the roof. Evargrah.

PHOTOGRAPHY APPLIED TO TOPOGRAPHY.

M. Chevallier, an assistant surgeon attached to the hospital of Gros Caillon, has submitted to the judgment of the *Société d'Encouragement* a new apparatus, which he calls a photographic plane-table, which enables any photographer to take, with great rapidity, all the altitudes, and to perform all the graphic operations necessary to the complete determination of the topography of a country, without any knowledge of the subject. As this apparatus is one which offers great practical advantages, the commission appointed to examine it went into the matter with great zeal and assiduity, and with a commendable desire to make their report as speedily as possible, choosing for their mouth-piece an eminently competent man, M. Benoit, the learned author of the "*Traité de la règle à calcul.*" His decision is entirely favourable; and, to give a perfect idea of the photographic plane-table, we cannot do better than reprint the essential part of the report:—"The photographic plane-table is composed of a solid tripod of an ordinary plane-table, around the axis of which a camera can revolve, the construction of which has been modified by M. Chevallier, and the object-glass of which can be pointed successively to all the visible points of the horizon.

"The glass plate, coated with collodion or sensitised albumen, is circular, and received in a concentric frame of a similar form, the periphery of which is furnished with teeth, after the manner of worm wheels. This frame and the glass plate can also revolve around their common axis, which passes above the daguerreotype picture in such a way that the latter projects itself entirely on the inferior part of the plate, and can be there limited laterally by two systems of shutters; either by two vertical ones, brought as near together as desired, or by two uprights, uniting at the centre of the plate, and inclosing as sharp an angle as may be considered advisable.

"It follows from these arrangements, that without taking out the plate from the interior of the modified camera, that by merely making it move round its axis sufficiently for a fresh image to project itself beside those already received, one may, by directing the object-glass towards all the points of the horizon in succession, obtain as many partial pictures, the whole of which, together, will constitute a sort of panorama of the locality.

"This *ensemble* is not a real panoramic picture, such as one obtains with the modified apparatus of M. Garella, for example; but no doubt it has already been divined that it is eminently fitted to resolve the topographical problem which M. Chevallier propounded to himself. Indeed, what more is required for this *ensemble*, while showing the aspect of the different signals serving as vertices to the triangles of the chain of the map to be taken, visible from the station occupied by the photographic plane-table, than to give, at the same time, the graphic horizontal projection of the angles embraced by the direction of these signals? It will, evidently, suffice, that the image of the verticals of these latter are traced in the partial views of which they form part, and that these images, which will cross, by construction, at the very centre of the plate, include between them angles equal to the corresponding azimuths, measured at the station; and it is precisely such a graphic tracery which is immediately obtained by M. Chevallier with the photographic plane-table, by extremely simple arrangements very ingeniously added to those already pointed out.

"1. *The image of the vertical of the observed signal* is furnished by the interposition of a fine horsehair, stretched vertically between the plate and the object-glass, and passing by the axis of this latter, and by the axis of rotation of the plate, because the plane that these axes and the hair determine, passes by the vertical of the signal.

"2. *The azimuthal angles* are reproduced with the aid of an indented circle, forming the plate of the tripod of the instrument, and of a communication of movement between this toothed circle, rendered fixed in space, and that of the frame of the plate.

"This communication is composed of two small shafts, crossing each other at right angles, working together by two small angular wheels, each furnished with a cylindrical-toothed pinion, that of the horizontal shaft with the vertical frame of the plate, and that of the vertical shaft with the fixed horizontal-toothed circle of the tripod. These workings in each other being combined in such a way that the plate makes one entire revolution around its axis in exactly the same time as the body of the apparatus occupies in making the tour of the horizon, it is evident that for the passage of the optical axis of the object glass from the vertical of one of the signals to that of another, this axis describes an angle equal to that comprised between the two vertical planes passing by these signals—an angle that the mechanical arrangements adopted by M. Chevallier will make the plate describe exactly, and embrace, without the possibility of error, by the images of the verticals of these signals, if the transmission of movement is made without loss of time.

"Thus the problem of the photographic tracing of the elements of the outlines of a topographical map, such as they are obtained with the ordinary plane-table, is ingeniously resolved, and without risk of error, because M. Chevallier's instrument supplies the means of assuring oneself, before receiving the daguerreotypic picture, that the vertical plane of the axis of rotation of the plate, of the optical axis, and of the horsehair, really passes by the vertex of a proposed signal. This essential condition is obtained by directing towards the signal a plongeante telescope fixed outside, of which the particular optical axis is movable in the plane of the hair, of the axis of rotation of the plate, and of the optical axis of the instrument.

"It is evident that the negative daguerreotype picture being obtained, as many proofs may be taken from it as are required, which will allow of their being placed at the disposition of different operators simultaneously.

"With the object of protecting his invention against so-called improvements, which are in reality nothing of the kind, M. Chevallier has combined his photographic instrument with the essential parts—limb and sliding-gauge—of a theodolite or double graphometer, with the assistance of which one may read the numerical amplitude of the azimuthal angles, as well as those of the angles included between the images of the verticals of the signals on the plates. A compass there gives the magnetic orientation of these angles, because by bringing the optical axis in the plane of the magnetic meridian the image of the hair will represent the trace of this plane on the horizon. Therefore, this instrument, such as it is made and presented to the Society, enables the observer to operate either trigonometrically or photographically, and, in all cases, the two methods of operation ought to lead to identical results, and mutually verify each other.

"Besides the topographical applications, M. Chevallier's instrument can easily furnish not only the different points of view discoverable from the station it occupies, but likewise the divers episodes, almost simultaneous, of a general action going on around, whatever may be their nature. To accomplish this, it is only necessary to utilise the exterior vertical limb visible behind the circular glass plate, around the axis of which turns an index connected with the frame of this plate. This index serves to indicate, by means of pins introduced and left in the open holes on its edges, the utilised sectors of the plate, and consequently those of its parts which have remained disposable, and entirely prevents the superposition of images."

The committee expressed a hope that the Society would share its satisfaction, and that it would encourage the inventor for his addition of another to the already long list of uses to which photography is applicable. The Society adopted the report, and gave its approbation to the photographic plane-table.

THE PRESENT STATE OF PHOTOGRAPHY.

Under the above title, in the *National Review* for the month of April, there is an admirably written article, evidently the production of one who thoroughly understands the subject, and who is perfectly acquainted with all the steps which have been taken in the development of photography. So highly does the writer think of the art, that he considers the two most startling productions of the exciting age in which we live, photography and electric telegraphy. So much so, that they "are naturally selected by the popular mind as representing, in an emphatic and characteristic manner, the rapid growth of a stupendous offspring from a seed of human knowledge so small that our fathers remember the day when it was hardly visible." The accounts given of the early attempts of discoverers is clearly and graphically sketched. He says:—

"We have few data for judging of the train of thought that led Nicéphore Nièpce to work through many years at the problem of producing a picture by the sunlight, and which induced him to put a firm faith in the conviction that such an end was achievable. Others certainly had gone before; but unsuccessful attempts on the part of others are rather deterring than inspiriting in their influence on the mind of the man who would venture in the trodden path; so that the results of Wedgewood and Davy, which failed, because they could by no then known means be rendered permanent, may have deterred M. Nièpce from the course so successfully followed, and subsequently, by Mr. Talbot, with the compounds of silver; while the less conclusive failure of Wollaston to make gum guiacum a photographic agent, may, by proving, at least, the decided chemical change effected by the violet and blue light on that substance, have prepared the mind of M. Nièpce for a resolute effort to make gum resins a means to that great end, in the attainability of which he evidently believed. We may thus understand his elaborating the first practical and successful process of 'heliography.' He formed his picture on the bituminiferous substance called asphalt, or bitumen of Judea (Jews' pitch), a body consisting of at least three, and probably many more, substances of a resinous nature, and most likely very variable in its chemical characters. . . . . This substance was found by M. Nièpce to be so changed by the light, as to be thereby rendered insoluble in substances that were capable of acting as solvents of it before it had been exposed to the luminous agency. This action of the light on many of these resinous substances consists, in fact, in a conversion of them into a new form of resin, more compact, more solid, and less soluble in certain essential and other oils, than they are in their pristine state. M. Nièpce discovered this fact; and after powdering the Dead Sea asphalt, and exhausting it of all its unchanged (and therefore soluble) portion by oil of lavender, he next spread this solution (in comparative darkness, of course), on a polished plate of silver, and drove off the solvent oil by heat. The silver plate, thus coated with the soluble part of the asphalt, was either exposed in the camera obscura for a lengthened time, or some leaf or other object was superimposed on it, and the light left to do its work wherever, and with a result in exact proportion to the intensity with which, its rays fell on the plate. After the action of the light was carried as far as was requisite, the plate was again removed to a dark room, and treated with a mixture of the oil of lavender and natural petroleum, or rock oil—a liquid of very complex and mixed composition that exudes from the soil of many regions. This mixture dissolved the asphalt that had been unaltered by the light, leaving the altered portion upon the plate in quantity proportional to the intensity with which the light had operated. A picture remained, therefore, upon the silver surface, represented by the asphalt in all the lighter portions of the original, whether an object in the camera, or a superimposed print, or any other thing that intercepted the light.

"The first real result in a great discovery is always worth detailing, even though rendered obsolete by the march of events. The heliograph we have described was the first permanent photographic picture ever produced, and it belonged to M. Nicéphore Nièpce to attain it. Its date was about the year 1826."

Before alluding to the poetic account of Mr. Talbot's motive in attempting to discover a means whereby he should make nature paint herself, we may notice the extraordinary series of coincidences which seem to constitute the history of photography. Those coincidences which occurred in its early days, when scientific gentlemen, without any preconcert, were bent on discovering the very same thing, need only be mentioned, as they are too well known to our readers to need recapitulation. But they certainly are novel in the regularity with which we find French and English inventors, after years of patient toil and study, reaching similar results at nearly simultaneous periods. The account of the motive which prompted Mr. Fox Talbot to set about making nature paint herself is something unique in scientific research. According to the writer:—

"It was on that beautiful Italian water, whose triple arms converge on the point of Bellagio, that Mr. Talbot longed for a power to enable him to bear away an image of Lecco and Como. There he resolved to work out the problem by which nature herself should be induced to perpetuate the outline of her own beauties in an artistic form. The earlier steps of his progress have never been told; but, in 1839, there was an announcement made to the world of the birth of a new art, practically available for this purpose. It was made simultaneously, though in different processes, in Paris and London; in Paris by M. Daguerre, in the form of the daguerreotype; in London by Mr. Fox Talbot, in the shape of a 'photogenic process,' for copying leaves, prints, &c."

The writer then proceeds to notice the various steps which were taken to improve the ingredients used by the manipulator so as to enable him to produce better results. For the benefit of our non-photographic readers we extract the following passage as containing an account of all the steps taken by the operator in order to obtain a photographic picture. It is so free from technicalities that anybody can fully understand the "process":—

"We will follow the manipulator into his dark chamber. The small amount of light allowed by his jealous care to penetrate that room of mysteries, is admitted only through yellow glass, and thereby filtered of those blue and violet, as well as invisible, rays, which are the energetic agents in the photographic result. Here we enter; and, if the experiment has been a successful one, ere we go out we shall be witnesses to a stroke of magic that might have made the teeth of a Cagliostro chatter. From out of his dark slide the photographist takes a square of glass. On its surface is spread that transparent film —infinitely delicate, for a touch will tatter it—on which so much careful skill has been brought to bear. It has just been exposed in the camera; in other words, for a few rapid seconds that delicate film has been placed where the image of some natural object—perhaps some pretty country scene—has been projected by a lens upon a focused plane. That fairy miniature, formed by the well-adjusted convergences of the refracted pencils of light, is a thing so beautiful, so unspeakably lovely, that none can, for the first time, look on the ground glass of a camera, focussed to a beautiful scene, without carrying away a new feeling, and a new delight. That lovely little picture is but a fantasy. Though every varied tint and every waving form be seen there as the eye sees it in nature—even, perhaps, more intense in its brilliancy, from its being more minute and concentrated, so to speak, in its scale—yet remove the glass screen on which the image falls, and it is gone, unsubstantial as a dream, and with something of a lovely dream's fascination. But let the glass screen be replaced by the sensitive collodion film, and some at least of the imagery of that otherwise transient picture may be rescued from oblivion. Was not the man a poet to whose mind this thought came on the Lake of Como? Was it not something of the creative faculty of the true ποιητής, that gave that thought its first triumphant realisation? We look then on the filmed surface of the glass that has for those two or three seconds been the retina, as it were, on which that image in the camera was projected; but it reveals only a blank. The most careful scrutiny will reveal no changes in it. But no time must be lost, or the surface will be too dry to receive the next process, by which the photographist sweeps rapidly over the glass plate a wave of a susceptible liquid. It is a mixture of a little acetic acid, a very little nitrate of silver, and a solution of a remarkable substance formed by the distillation of gallic acid (pyrogallic acid). Look on the glass plate—a moment's pause—it is but a moment; for now, revealed with magic suddenness, and growing rapidly, with increasing loveliness, each moment brighter, clearer, sharper, there is the picture. But the sky is black; and athwart it, with infinite ramifications of living and gnarled branch, each point tipped with the young bursting leaf buds (for it is full spring tide), stands out, in a weird contrast, that oak tree in the foreground, white against the dark, midnight looking sky; yet not entirely white; for a closer view, as the magic growth is fulfilling itself, reveals a thousand pencillings of delicate lines and inexplicable shadows, giving roundness, sharpness, life, to every organic twist of the old tree. Underneath and round it, from the black stone in the foreground, in relief on the white grass, to the tiny fairy cottage under the hill, beside the far drawn perspective of that dark-watered streamlet, a black cottage, with its white window lattices, is spread a scene, not indeed the same we saw but now on the screen of the camera—and yet how like it! The outline is the same. That old oak is a familiar friend loved by our grandsires, and one cannot fail to recognise its well known form. Under the hill stands, indeed, a cottage, and its little roadway fords the streamlet; but it is, in reality, a *white* cottage, with its brightly gleaming windows barred by dark lattices—a little cottage home of England. Why is that gleaming river a dark line, and not a delicate white thread of gleaming rapids? One word explains the spell. It is a negative picture. Those strange underlights in the oak boughs are thrown by no level sun setting on the horizon. Those shadows are not flung athwart some 'land lit by a large low moon.' Those weird *lights* are natural *shadows*; and those inexplicable shades are the lights of the natural picture: but the lights have left a darkening impress on the sensitive surface, and the shadows of nature are left as lights on the photograph, because there the plate was less illuminated when they fell. The picture is complete, and the practised eye of the operator sees the moment to be come when further development would be prejudicial, and the action must be stopped. He washes it carefully, but thoroughly, with water; and the picture, as now looked at, is composed of 'lights' in nature, represented by the *dark* silver deposit, and 'shadows,' represented by the primrose-*yellow* iodide of silver, still remaining on those parts of the film where the light was comparatively inactive. By the yellow light the tint of the iodide is undistinguishable from white, and its comparative opacity gives a 'body' to the picture. It only remains now to fix the image."

Speaking of the application of photography to the reproduction of works of art, the author says :—

> "But perhaps the most valuable application of photography is one in which it has already been very successfully employed —the reproduction, namely, of facsimile drawings after Raphael, and the other great artists, whose genius could write a poem in a line, and convey the expression of a human heart in a symbol little other than a doll, yet embodying the thousand-fold cares, sorrows, and affections of a human eye. Here the photograph is an unrivalled, an unapproachable, transcriber. Photography will doubtless be also continually more employed in perpetuating and disseminating engraved works, such as those of Marc Antonio; while, as an unerring copyist of the records of other times, in other lands—in giving to a Rawlinson the materials for his researches, in the form of exact copies of inscriptions on the great monuments of Assyria or Egypt—it has done much, and will do more, good service."

The writer divides the present state of investigation which is going on in the photographic world into three heads:—

"1. Methods of rendering the sensitive plates portable, so that they need not be used the moment they are prepared, *i.e.*, preservative processes.

"2. Methods of producing actual engravings or printing blocks, from which prints can be taken, *i.e.*, phototypic and photoglyphic methods.

"3. Some of the applications, whether useful, artistic, or only curious, to which photography has been applied."

We are glad to find that the writer speaks so favourably of Mr. Hardwich's *Chemistry*, while the remarks he makes upon the *Journal of the Photographic Society* are, although true, anything but complimentary. The writer seems to consider it the tomb of the undigested results of the efforts of inventors. As to the three heads into which the author has divided the subject of photographic investigation we need not here allude to them, as they have been so fully treated of in these pages, especially the photoglyphic invention of Mr. Fox Talbot, which was *first* communicated to the public in "The Photographic News." To the subject of photography, in relation to art, which is here treated in a few paragraphs, we shall probably have occasion again to revert.

PRINTING UNDER DIFFICULTIES.

By an article of the French code, every possessor of a clandestine printing office is liable to a penalty of 10,000 francs, and imprisonment for six months. A short time ago a photographer was found to be in the practice of printing writings, in the following manner :—He took a glass plate, which he covered with an opaque varnish, on which he traced the words he desired to reproduce, by cutting down through the varnish to the glass plate with a sharp-pointed instrument. He then took a sheet of chemically prepared paper, and exposed it under the glass to the action of the light in the ordinary manner, the result being that the letters traced on the varnish were printed on the paper, which was then treated with a fixing agent, and the thing was complete.

The matter coming to the knowledge of the police, they made a descent upon his premises, and seized the things necessary to prove the facts given above; and the case came before the tribunal of Marseilles, which decided that it did not come under the article of the code referred to. Against this decision the public prosecutor appealed, and the affair was brought before the Imperial Court at Aix, which annulled the decision of the Marseilles tribunal, and inflicted the full penalty of fine and imprisonment allowed by the law. The unfortunate photographer now exercised his right of appeal. His counsel urged several objections against the conviction, the chief of which was that the article in question specified certain kinds of printing, namely, typography, lithography, and engraving; and was not intended to apply to a process which was neither of the three. The court, however, overruled these objections, and confirmed the conviction.

We give the above as an illustration of the pressure under which photographers exercise their profession in a country which is about to sacrifice, possibly, thousands of its sons in giving liberty to Italy; not because we deem this particular case one of peculiar hardship, or the prohibition to practise this kind of printing as of any importance; the slowness of the process would always be a bar to its use. But what would be the feeling of photographers in this country if they heard that one of their number had been taken to Bow-street, by order of Sir Richard Mayne, and sentenced to six months' imprisonment and a fine of £400, for having in his possession a negative capable of yielding a page of writing or print?

Critical Notices.

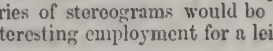
Stereograms of the Vale of Neath.

We have been shown a series of landscape stereograms, taken chiefly in the neighbourhood of Neath. In these days of extensive stereographic publication, we are accustomed to see such really excellent things that, when we come upon anything not up to the standard, we are inclined to look upon it as only mediocre. The views before us have many good points in them; but, in regard to the photographic department, they are scarcely up to the mark. They are too intense, and, as a consequence, there is, in many instances, scarcely any half-tone, and too little detail. The best view in the series is the "Old Flint Mill, Vale of Neath." The treatment of this subject is very clever, as the very things which cause defects in the other pictures add to the interest and beauty of this. The hard and flinty character of the soil, and the arid scenery, are greatly heightened by the intense tone in which these photographs are printed. The views "Dinas Glon," and the "Lower Cillufiste Fael, Vale of Neath," are two very interesting little bits of scenery; and, if the defects which we have pointed out were remedied, few series of stereograms would be found capable of affording more interesting employment for a leisure half hour.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

A handsome face is of an oval shape, both front view and in profile; in the latter it will be seen how gently the forehead and chin recede; how beautifully the top and back of the head are rounded, no one organ predominating to destroy its even line. The nose, slightly prominent in the centre, with small, well-rounded end, fine nostrils; small, full, projecting lips, the upper one short and curled upwards in centre, the lower one slightly hanging down in centre, both turned up a little at the corners, and receding inside, of a vermilion colour; chin round and small; very small, low cheek-bones, not perceptibly rising above the general rotundity. Eyes large, inclined upwards at the inner angles, as in the figure, downwards at outer angles; upper eyelids long, sloping beyond the white of the eye towards the temples.



Eyebrows arched, forehead round, smooth, and small; hair rather profuse, and dressed to follow the form of the head, as a beautiful face is disparaged by having the hair wrongly dressed. Of all things, do not draw the hair over the forehead if well formed; but, rather, up and away. See the Venus de Medicis, and, for comparison, see also Canova's Venus, in which latter the hair is too broad.

An intellectual head has the forehead and chin projecting, the high facial angle presenting nearly a straight line; bottom lip projecting a little, eyebrows rather near together and low (raised eyebrows indicate weakness). Broad forehead, overhanging eyelids, sometimes cutting across the iris to the pupil. For further information upon this subject, see Lavater, or some such author, on "Physiognomy."

Expression.—When people sit for photographs, they generally contract their eyes to avoid the glare of light. With the eyes, the whole face becomes contracted often, and a disagreeable expression results. To correct this in painting, as a general rule, the upper eyelids will require raising and widening; lower eyelids drooping; irises will require enlarging, eyebrows raising and opening (as they will probably be drawn together producing something like a frown), corners of mouth raising, centre of forehead making lighter; and the line down from the sides of nose towards corners of mouth softening. We have seen, in bad photographs of handsome young ladies, deep wrinkles about the eyes, the forehead, and corners of mouth, caused by this drawing up of the face in pain from the light.

Expression can be produced by light and shade without altering the form of lines; for instance, a darkness between the eyebrows in a head, would make it sad and thoughtful; at least, as to the expression on the forehead: then, to convert the whole face from happiness to sadness, it would only be necessary to introduce a darkness on the upper part of the cheek, immediately below the eyes, and below the corners of the mouth; because, if the muscles of the face were under the influence of joy, the light coming overhead, such parts as were raised catching the light, would be bright; whence it will easily appear that introducing shadows in these places, or deepening the bright lights too much, would not only destroy the intended expression, but, if carried to excess, produce quite an opposite one.

In these remarks, as also in those that follow, it is understood that the light comes from overhead, for if it came from below, all this would be just reversed.

Tints in Various Parts.—The colour of flesh, under ordinary circumstances, varies in different parts, although, to persons who view things superficially, it may appear only of one tint throughout; yet, if it were painted so, with only different degrees of shade, such a picture placed by the side of one wherein every delicate degree of pearly tint was introduced, the former would be found to suggest only a form of clay, without any of that suppleness or transparency peculiar to flesh, which suggests that blood runs beneath the skin.

Beyond a few leading points of light, it will be found that there are no two parts of a head alike; all is varied; the general tint is, as it were, refined through various conditions; from the warmth of light, through degrees of pearly tints, to the purply hue blending into the warm shadow. On the forehead the tints are more inclined in the centre to yellowness; on the outsides, temples, &c., to blue; sides of cheek-bones, &c. rather warm; indentations at corners of mouth, rather blue; in front of cheeks the tints are fresh and laky; chin warm; neck and bosom, bluish; the latter having its pearly tints visibly increasing to blue. The hands are generally of a pinkish colour inside and towards finger ends; wrists bluish.

(*To be continued.*)

Dictionary of Photography.

Chrysotype.—A photograpic process discovered by Sir J. F. W. Herschel. It is as follows:—The paper is washed in a solution of ammonio-citrate of iron, it must then be dried, and subsequently brushed over with a solution of ferrocyanide of potassium. This paper, when dried in a perfectly dark room, is ready for use in the same manner as if otherwise prepared, the image being impressed upon it either from nature in the camera obscura, or from an engraving in a frame in the sunshine. The image so impressed is, however, faint, and sometimes hardly perceptible. The moment it is removed from the frame or camera it must be washed over with a neutral solution of gold, of the strength of sherry. Instantly the picture appears, not indeed at once in its full intensity, but darkening with great rapidity up to a certain point, depending on the strength of the solutions used, &c. At this point, nothing can surpass the sharpness and perfection of detail of the resulting photograph. To arrest this process, and to fix the picture (so far, at least, as the agency of light is concerned), it is to be thrown into water slightly acidulated with sulphuric acid, and well soaked, dried, washed with bromide of potassium, rinsed, and dried again. Sir J. Herschel states that in point of direct sensibility, the chrysotype paper is certainly inferior to the calotype; but it is one of the most remarkable peculiarities of gold as a photographic agent, that extremely feeble impressions, once made by light, go on afterwards darkening spontaneously, and very slowly, apparently without limit, so long as the least vestige of unreduced chloride of gold remains in the paper. To illustrate this curious and important property the following experiments may be mentioned:—It is well known to chemists that oxalic acid heated with solutions of gold, precipitates the metal in the metallic state. Light, as well as heat, also operates in this precipitation; but, to render it effectual, several conditions are necessary: 1st. The solution of gold must be neutral, or very slightly acid. 2nd. The oxalic acid must be added in the form of a neutral oxalate; and 3rd, it must be present in a certain considerable quantity, which quantity must be greater, the greater the amount of free acid present in the chloride. Under these conditions the gold is precipitated by light as a black powder; if the liquid be in any bulk, and if merely washed over paper, a stain is produced, which, however feeble at first, under a certain dosage of the chloride of gold, oxalate, and free acid, goes on increasing from day to day, and from week to week, when laid by in the dark, and especially in a damp atmosphere, till it acquires almost the blackness of ink; the unsunned portion of the paper remaining unaffected, or so slightly as to render it almost certain that what little action of the kind exists is due to the effect of casual dispersed light incident in the preparation of the paper. If paper prepared as above recommended for the chrysotype, either with the ammonio-citrate or ammonio-tartrate of iron, and impressed with a latent image, be washed over with nitrate of silver instead of a solution of gold, a very sharp and beautiful picture is developed of great intensity. These pictures may be fixed by hyposulphite of soda.

Citric Acid.—This acid derives its name from the citron, in the juice of which fruit it is present in great abundance. It is met with also in most acid fruits, such as the gooseberry, cherry, raspberry, and orange. It is obtained from the citron by saturating the juice with chalk; an insoluble citrate of lime is thus formed, which, after well washing, is decomposed with sulphuric acid. The liquid is concentrated by heat, and allowed to cool, when citric acid separates out in large crystals. This body has a very agreeable acid taste; it is easily soluble in water and alcohol, but its aqueous solution soon turns mouldy; it will, therefore, be preferable, if it be desired to have a solution of citric acid always at hand, to keep it in solution in alcohol. This acid can frequently replace acetic acid in photography. M. Gaillard was the first to propose this substitution in the preparation of pyrogallic developing solution for negatives. In this case the image does not appear so rapidly, but with more regularity and sharpness; and the negative, instead of being of the ordinary brown colour which acetic acid gives to it, is usually of a fine blue-black tint. Citric acid must be used in far smaller quantities than acetic acid. It should not exceed more than half the weight of the pyrogallic acid employed.

Citric acid is extensively used by the calico printer, for discharging the mordant from the cloth in patterns. It is used in dyeing silk, and also in medicine. When united with bases it forms *citrates*.

Citrate of Lime is formed when citric acid is added to lime water and the solution boiled; it forms a white insoluble powder.

(*To be continued.*)

A Catechism of Photography.

PHOTOGRAPHIC EXCURSIONS—*(continued)*.

Q. Does the colour of objects affect the photographic impression?

A. It does; and therefore, in taking a proof, it is necessary to bear this fact in mind, if we desire to secure an image perfect in all its parts, and harmonious as a whole.

Q. In what way is the photographic impression affected by colour?

A. Certain colours produce scarcely any perceptible effect, or, are very slow in action. Such colours are black, red, yellow, and green. Others, on the contrary, as blue, violet, and white, are very rapid in action. Thus, for trees, old ruins, &c., it requires longer time to procure a perfect image than for recently erected structures, white tents, or clear skies.

Q. Is any artistic care required in the arrangement of the picture?

A. Yes. In order to secure a pleasing photograph, the operator should so select his point of sight as to give the most picturesque effect to his picture, and should, if possible, introduce a figure or a carriage, so as to furnish a standard for relative proportions.

Q. In taking views, is it best to work by sunlight or by ordinary daylight?

A. It is best to work on a bright, sunshiny day. Besides the increased rapidity of action which it secures, it gives greater relief to the picture by a full effect of light and shadow. But the operator must exercise discretion in this, as in all the other departments of photography, otherwise he will produce pictures neither remarkable for beauty nor effect.

Q. How are the negatives taken to be preserved?

A. They should be carried in the portfolio, as already stated, and be carefully preserved from the action of light.

Q. Is it best to use the waxed paper on a photographic excursion?

A. Yes; the waxed paper is very convenient. The certainty with which the wax preserves the paper which has passed the bath of iodide of potassium, permits the preparation of a large quantity. When it happens to fail, it must be prepared anew with a solution previously made, or made on the spot; very great care, however, must be taken, that all the basins or dishes used to contain the solution should be chemically clean.

Q. How are these manipulations to be performed by the travelling artist?

A. It is necessary to procure a room for this purpose, and to cover the windows with yellow or orange coloured paper, so as to exclude the chemical rays of light. This may be done very easily; but it is still easier to reserve all such chemical operations till the evening, and work safely by artificial light.

Q. How are the images to be developed?

A. The images should be developed in the ordinary way, with gallic acid, afterwards washed in clear water, and *partially* fixed in a saturated solution of common salt, or in a bath of bromide of potassium. Subsequent to this operation the proof must be washed again in fresh water, dried between blotting paper, and stowed away in the portfolio, until a convenient time offers for fixing them with hypo. in the regular way.

Q. When it is difficult to procure distilled water or rain for these manipulations, will ordinary river water answer the same purpose?

A. Yes, if the following instructions be adhered to:—Add to the water four or five drops of aceto-nitrate; then filter carefully; after this it will serve for any purpose that may be required.

Q. Are not accidents very likely to occur in carrying the photographic apparatus about the country?

A. Accidents may, and do frequently occur: but the practised operator is prepared to meet most of them by carrying with him a more than sufficient supply of all the chemicals he may require, and such tools as may enable him to remedy any little damage that may happen to his stand or camera box. The worst evil the operator has to fear is, the spoiling of his proofs, as this is often irreparable, but a proper amount of care will secure him from this; and, as a very proper precaution, he should always take two or three proofs of the same building or landscape, and thus make sure of a good working negative.

END OF PHOTOGRAPHIC CATECHISM.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 17, 1859.

In our last paper we promised to speak of some of the photographic curiosities in the Paris Exhibition. We shall mention, in the first place, a number of positive proofs in which the black parts are of carbon. This is one of the latest steps that photography has made towards perfection. If it be impossible, for the present, to obtain and fix the natural colours of objects by photographic means—we shall see presently that *impossible* is not exactly the word—it is a great thing to obtain an image that will last for ever, whatever be its colour.

Silver and salts of silver, bichromate of potassa, and the whole list of sensitive agents described by photographers, do not possess the permanency or stability of carbon—an element which resists all our chemical means of destruction. Some of our readers will, perhaps, remember an anecdote that made a little sensation in Paris about ten or twelve years ago. A manufacturer of marking ink praised his produce to such a degree, that every one thought it must be absolutely impossible to erase any characters written with it. Proud, to the highest degree, of his invention, he took a bottle of it to one of our friends, a young chemist, who begged him to write upon a piece of paper the words "*Encre indélible*," and to sign his name underneath. Our manufacturer willingly complied, and the next day the paper was returned to him with his signature, and the words "*Encre délible.*" Our friend had taken out the syllable "*in*"*!*

Carbon proofs have been exhibited by Mr. John Pouncy, of Dorchester; in all, ten positives—views from nature, portraits, copies of engravings, &c.—obtained by a process with which the readers of the "PHOTOGRAPHIC NEWS" are already acquainted. We may safely affirm, that the most attentive observer could not distinguish these proofs from ordinary photographs.

MM. Garnier and Salmon have also exhibited a considerable number of carbon proofs, some on paper and some on glass. We are really surprised at the high degree of perfection to which this new and important method of photography has already soared. The proofs exhibited by Messrs. Garnier and Salmon are larger than those of Mr. Pouncy, but they are hardly equal to the latter in neatness of outline.

We have also three proofs by M. de Brebisson, of Falaise, representing the "Rocks of Noron" (Falaise). All three are taken from the same negative. One was obtained by chloride of silver; the second by nitrate of uranium; the third by the carbon process. The two former are very good proofs, and in every respect equal to the other views exhibited by this photographer. The carbon proof has not succeeded quite so well, but is really so good, that this essay is doubtless the forerunner of many a better.

We must mention, *en passant*, some lithographic stones exhibited by M. Asser, of Amsterdam. They are engraved photographically, and M. Asser calls them "positifs à l'encre d'imprimerie" (positives in printing ink), and "transport autographique sur pierre par un cliché positif sur papier à l'encre lithographique," or the transportation of a positive proof in lithographic ink on to stone. We are not acquainted with M. Asser's process. The specimens exhibited are far from perfect, though they appear to be the result of many interesting experiments, and as such deserve notice.

Let us pass to another subject:—M. Testud de Beauregard has "taken in" more than one unconscious admirer of photography. Many have left this exhibition with the impression that M. Beauregard has obtained photographs of objects in their natural colours. This is true, but only to a certain extent. A large and fine proof, exhibited by this photographer, represents some poppies, sweet-peas, and corn-flower (*centaurea*), in a glass of water. Underneath we have the inscription: "COLOURS OBTAINED PHOTOGRAPHICALLY," &c., and in the catalogue, "Positives representing flowers with their colours obtained without touching up, and by a single exposure to light," &c. The sweet-peas are white, the corn-flower blue, the poppies red, and the leaves and stems green. The whole is on a brown back ground. "Colours!" exclaimed a friend. "Yes!" said we, disguising an old couplet—

"The poppies are red, the corn-flowers are blue,
I was taken in . . . . . and so were you!"

The red colour has succeeded best, next come the green stalks and leaves; the blue of the corn-flower is faded, and the white pea has a yellowish tint. The glass and water are beautifully transparent, and taking everything into consideration, this is one of the most extraordinary proofs in the Exhibition, and well calculated to astonish the unconscious beholder, and those amateurs of photography, who still maintain it impossible to produce anything like the colour of the natural object in a permanent manner, by photographic means alone.

The process employed by M. Testud de Beauregard was patented in London for the inventor, but in the name of Mr. Charles Cowper, on the 12th December, 1857. No salts of silver are employed. The whole secret consists in the use of gelatine or gum and bichromate of potash. This mixture, as is well known, becomes insoluble in water by the action of light. If, before it be submitted to exposure in the camera, certain insoluble colouring matters be mixed with it, such as charcoal for the blacks, vermilion for the reds, &c., these colours remain fixed and insoluble on those parts of the proof upon which the light has acted. All the rest of the composition is washed off with water, and the image remains coloured.

It is no easy work to manage the colours in such a way that each part of the proof receives its proper tint, and we think it is almost impossible to arrive at a high degree of perfection, by this process, in an artistic point of view; but as a *curiosity*, the proof exhibited by M. Beauregard is interesting in more points than one.

M. Wagner, of Paris, has exhibited some very remarkable microscopic proofs. Among them we notice the speech made by the Emperor of the French at the opening of Parliament this year. It is copied from the *Moniteur*, and occupies two whole columns of that paper. The image is barely visible with the naked eye, and requires a tolerably powerful microscope to be read.

But far more interesting than these *tours de forces* are the photographs of natural microscopic objects, exhibited by Messrs. Nachet, by M. Bertsch, and by M. Bernard, of Paris. Here we have faithful copies of microscopic *foraminiferæ*, *diatomaceæ*, &c., which deserve the highest praise. We do not know a wider field for photography than that of natural history. The production of such proofs as those just alluded to ought to be encouraged. The objects they represent become daily more interesting as natural science progresses; and men of science, habituated as they are to the stern reality of facts, and the faithful representations of natural objects, already find in photography a most valuable aid in which they may place entire confidence. We cannot praise too highly any endeavours made in this direction by photographers, and we hope soon to see our professors of botany and zoology in possession of complete sets of photographs representing the types of the families and genera of *infusoria*, *foraminiferæ*, *sponges*, *minute corals*, *algæ*, &c., by which they may render their lectures on these wonderful creatures doubly interesting and intelligible to every one.

We would add that attempts have been also made to reproduce by photography the more minute anatomical parts of the body of animals. Not only success in the art, but a vast amount of practical utility attends these endeavours.

Madame Laffon, of Paris, has sent to this exhibition, amongst other photographs which we shall not mention here, two silk hand-screens, upon which very pretty engravings have been copied photographically on the silk. These are most elegant, and have been universally admired.

M. Garnier, of Guernsey, has exhibited some portraits obtained at night by means of the electric light. They are curious, certainly, and that is all we can say of them. They remind us of some of the first attempts at photography on paper. When our overnight literary duties shall have completely prevented our rising from our bed before sunset, we shall, perhaps, deem it worth while to have our portrait taken by the electric light and in the *atélier* of M. Garnier, but not before.

Another interesting memoir of the indefatigable M. Niépce de St. Victor is presented to-day to the Academy of Sciences with the title "Memoir on Thermography; or, Calorific Radiations considered as a means of producing Images on Sensitive Paper." This work, which will appear in the *Comptes Rendus* and in *Le Cosmos*, has, doubtless, its place reserved in the "PHOTOGRAPHIC NEWS." We would, however, call attention to one most remarkable fact contained in it: when images of engravings, letter-press, &c., are being produced by means of heat alone, it is found by experiment that when certain salts are employed, the *white* portions alone are produced, whilst, when other salts are used, the *black* portions alone are engraved. This shows clearly that the particular *nature* of the substance employed has an immense influence on the phenomena observed. Heat, it seems, will pass through the black portions of an engraving to attack the sensitive photographic paper, which is placed in contact with the former, when nitrate of silver and chloride of gold are employed together; whilst, if nitrate of silver be employed alone, this heat seems to pass only through the white portions. There are, moreover, many other parts that will be read with interest.

M. Faye has just read, at the Academy of Sciences, a long dissertation upon one of the most curious astronomical phenomena that our generation ever witnessed, namely, the splitting up of Biela's comet, which, as is well known, became, at a certain period of its existence, two comets instead of one. M. Faye shows that a similar phenomenon was formerly remarked by the ancients to have happened to the comet of Ephorus, spoken of by Seneca. He affirms that this phenomenon is to be attributed to the intervention of a foreign attractive force, and that a similar one, namely, that of the sectioning of the nucleus, is not of rare occurrence, especially among the less brilliant telescopic comets, and was actually observed in Donati's comet of last year. In these cases a series of secondary nuclei are formed in the head or nucleus of the comet. M. Faye calls attention to the fact that Biela's double comet is expected to return to our part of the universe in the year 1860, when it will, doubtless, form a most interesting object of research for astronomers.

M. Hesse, a distinguished naturalist, of Brest, has just communicated to the same Academy a most laborious series of researches on some minute animals of the class cirrhipoda, in which these curious little beings are studied from the moment they leave the egg, through all their wonderful metamorphoses, until they enter the adult state. The result of this author's work, which is accompanied by more than one hundred water-coloured drawings, is that the cirrhipoda which have been classed first among the annelides, then among the mollusca, then, again, with the crustacea, must definitively be ranged among the latter. To the class of cirrhipoda belong the "acorn shells" (*balanus*) and barnacles found on our shores or attached to ships. The *ship barnacle* (*Pentalasmis anatifera*) derived its specific name *anatifera* (which signifies a thing which gives birth to a goose) to a rather singular circumstance. An old writer, named Gerard, expended, in the year 1636, a large amount of logic to prove that these creatures developed themselves into barnicle geese! He says that their shell "cometh to full maturitie and falleth into the sea, where it gathereth feathers and groweth to a fowle!" M. Hesse's doctrines certainly do not go so far as those of this old lunatic; but the metamorphoses undergone by these cirrhipoda from the moment they leave the egg to the time of their reproduction, are quite as wonderful as the fabulous account given above. Those who would witness them must take the animal in the egg and study it through its entire development (a task of some months) under the microscope. Whilst admiring M. Hesse's beautiful water-coloured drawings of these little beings in their different stages of life, we were struck with the thought that an immense amount of trouble would have been spared had he brought photography to his aid.

P.S.—M. Niépce has just found a method of transforming his red photographs, of which we have already spoken, into black ones. For this, a red proof is plunged for a few seconds into a dissolution of per-chloride of iron (5 per cent.), to which 1 per cent. of hydrochloric acid has been added. In a second or two the proof is of a dark green, and by washing with water soon takes a fine black tone.

THE PHOTOGRAPHIC SOCIETY.

In justice both to Mr. Heisch and Mr. Malone, we consider ourselves bound to publish the following letters, which have been addressed to us by these gentlemen:—

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—As I observe in the report of the last meeting of the Photographic Society a statement which is likely to convey a false impression to your readers, I shall feel obliged if you will allow me to state the facts in your journal. The statement I allude to is this:—"In reply to a question by Mr. Malone, he was informed that Mr. Heisch had written to the secretary that he had neither time nor inclination to attend the collodion committee, and that he considered a great liberty had been taken in *proposing* his name without his consent." This would imply two things:—1st. That I had been asked if I would serve on the committee; 2nd. That I thought Mr. Malone had taken a great liberty in *proposing* my name. Had the secretary read my letter, it would have been seen that neither is true.

If Mr. Malone thought I could be of use on the committee, he had a perfect right to propose that my name should be added, which he did with the express understanding that I should be asked if I were willing to serve.

Instead of this, the first intimation I had of the matter was the receipt at 10 a.m. of a printed *summons* to attend the collodion committee at 4 p.m. of the same day.

I, of course, concluded from this that my name had been placed on the list of the collodion committee without reference to me, and as I considered such a proceeding (considering especially that I am not even a member of the Society) as an unwarrantable piece of impertinence, I replied that if my name had been *placed on* the collodion committee (not *proposed* as stated), it had been done without my knowledge, and I had neither time nor inclination to attend—the want of inclination being caused by a dislike to have anything to do with those who could treat a perfect stranger in so uncourteous a manner.

In conclusion, I must add that there are many members of the committee for whom I entertain the greatest respect, and who, I feel sure, were no parties to such conduct.—I remain, yours faithfully, CHARLES HEISCH.

Middlesex Hospital, May 10, 1859.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—In the report of the last meeting of the London Photographic Society, as given in the "PHOTOGRAPHIC NEWS," I find an editorial remark, which requires a few words from me in explanation. You express surprise at my satisfaction with the answer given me by the secretary respecting the addition of certain gentlemen's names to the list of the collodion committee.

I was satisfied, because I found it was not intended to exclude either of the gentlemen I proposed on the ground of their being non-members of the Society; and further, because I learnt that Mr. Spiller, who was unable to attend the first meeting, would attend in future, if summoned and free to do so. Mr. Heisch declined, as you are probably aware, because he was peremptorily summoned without having been first asked if he had any objection to attend, as was proposed. He does not object to the use *I* made of his name.—Yours very truly, T. A. MALONE.

London Institution, Finsbury Circus, E.C., May 10.

Miscellaneous.

CONVERSAZIONE AT THE PHARMACEUTICAL SOCIETY.—There are but few of the arts and sciences which are not now more or less intimately connected with photography. Each day, almost, sees its application to some novel purpose, and yet the extent of its capabilities is probably far from being reached. Its power of depicting a field of battle, on which thousands of men are engaged in mutilating and killing each other, appears to us as nothing very extraordinary; but who, a few days since, would have believed it possible for this agent to produce a trigonometrical plan of this same field? Its triumphs, however, as we are well aware, depend less on the manipulator than on the substances he employs; hence, photographers are deeply indebted to the Pharmaceutical Society for the effort it has made to insure purity in the manufacture of compounds, without which photography could not exist. The beauty of the specimens exhibited in its museum is such as to attract the admiration of all who look at them, even if their knowledge of chemistry extends no further than that of a correspondent who wrote to ask us for a remedy for a silver bath, which was at the same time too acid and two alkaline. An excellent opportunity was given us on Tuesday evening of judging of the extent to which chemists are interested in this institution. At the *conversazione*, held there on the evening in question, the visitors filled not only the rooms, which are large and numerous, but a goodly number overflowed into the passages. Happily, there were no ladies present, and thus the inconvenience arising from this circumstance was of little importance. The arrangements for the entertainment of visitors were, we believe, made under the direction of the esteemed vice-president of the society, Mr. Bird, and were in every respect excellent. Numerous microscopes were placed about the rooms, showing the wondrous effects produced by viewing crystals of various substances through the medium of polarised light, electro-motive engines, and many other scientific inventions. Of course, there were plenty of stereoscopes, and a large variety of slides of average excellence, but *the* photograph was that of the moon, by Mr. De la Rue. Seen in one of Professor Wheatstone's reflecting stereoscopes, made expressly for the purpose, it is one of the most interesting objects it is possible to conceive. In this stereoscope the moon appears a solid globe moving in space, of the same apparent diameter, as when seen moving in the heavens with the naked eye.

THE BROMIDES AND IODIDES OF BISMUTH, ANTIMONY, AND ARSENIC.—At a recent meeting of the *Académie des Sciences* M. Nickles read the summary of a paper on the definite bromides and iodides of bismuth, antimony, and arsenic. "Very little is known of the definite state of these compounds, nor has it hitherto been possible to study their physical qualities. The preparation of some of them, by the ordinary processes, is not unattended with danger. The three metals in question combine with bromine with so much force, that the phenomenon is accompanied with combustion, projection of the liquid, and even detonation. Sérullas, who has made the most careful experiments upon them, prepared them by direct union, adding the metal only gradually to the metalloid. Having occasion for several of these compounds in making some researches, of which I shall have to speak later, and struck with the great difficulties presented by the ordinary mode of preparation, I endeavoured to simplify it, and have succeeded so well that henceforth the preparation of these compounds may be classed among the most elementary processes. At the same time they may be obtained in the state of very clear crystals, which allowed me to define the form of several amongst them. The principle of my process is the same in all cases, with regard to these compounds, and consists simply in causing the bromine or the iodine and the metal to re-act, with the assistance of a liquid, which should be equally a solvent for the metalloid, and for the compound it is the object to obtain. In this manner I prepare bromide of bismuth by projecting the powdered metal in anhydrous ether, containing its own volume of bromine, and the bromide of arsenic or of antimony, by causing the powdered metal to re-act upon the bromine, diluted with sulphide of carbon. The same process is applied for the iodide of arsenic and that of antimony, both soluble in sulphide of carbon, and crystallisable from that liquid. The three bromides are very unstable in conjunction with water. However little of this liquid the solvent may contain, an equal quantity of bromide is obtained in a state of white deposit. This re-action is so evident that it may be employed to ascertain the presence of a very small quantity of water in any of the liquids in question. The bromides of bismuth $Bi\ Br_3$, of arsenic $As\ Br_3$, and of antimony $Sb\ Br_3$, are fusible at a moderate temperature. They are, moreover, deliquescent. On exposure to the air they become liquified, in the order in which they have just been named. The first becomes crystalline in a vacuum, and exhibits beautiful prisms, resembling those of the bromide of arsenic. The bromide of antimony exhibits rhomboidal octohedra, occasionally modified by terminal points, which constitute oblate prisms of 69 degrees, terminated by points of 80 degrees. The iodides of arsenic and of antimony are unalterable when exposed to the air. They are isomorphous, and belong to the rhomboidal system. Their form proceeds from a double pyramid of six facets, whose summits are modified by a terminal facet. Frequently this facet is so developed that the crystal assumes the form of a hexagonal table. These two pyramids intersect each other at their base, at an angle of 133° 62′, and form with a terminal face an angle of 120°. At the side of these principal faces are frequently found secondary facets which appear to belong to hemyedrical figures. These forms are easily developed in iodide of arsenic, when crystallised with an excess of iodine. The result loses this excess by exposure to the air. The crystalline form is not injured by this loss, the colour only being changed from brown to red. As yet no double salts formed by these bromides or iodides are known, doubtless because these latter become resolved in water, even when impregnated with an alkaline bromide or iodide. I have obtained some, however, in operating in the absence of this liquid; thus it is sufficient to warm the syrupy bromide of bismuth with some bromide of ammonium to make it deposit when cooling beautiful yellow plates of the double compound in question. In similar circumstances the same bromide will give a double salt, crystallised in beautiful prisms. These bromosalts are easily soluble in water. The general process here described is easily accomplished, even by the inexperienced chemist. Doubtless the bromised liquid becomes heated when the operation is quickly performed, but accidents may be easily prevented by plunging the vessel into cold water. In this way the reaction may be immediately modified, as it may also be assisted, by the use of hot water; these precautions are less indispensable with the iodides. I have found that light excites the reaction. Iodide of arsenic is used in medium, and its preparation by a wet process furnishes it of a perfectly constant composition, which is not the case when prepared by a dry process. I have said above that the compounds of which I have been speaking are not known under any very definite form, but I should add that since these researches were undertaken, the bromide and iodide of arsenic have been obtained by the dry process, in a crystallised state, by Mr. Wallace. I have only just received the news of this in the last number of the *Philosophical Magazine* for April, 1859. From the facts that I have just submitted, and the results that I have the honour to lay before them, the Academy will easily perceive that my labours and discoveries are perfectly independent of those of the English chemist."

PHOTOGRAPHIC INCIDENTS.—One of the spectacles appertaining to photography is that which the departure of our troops to Italy offers. There are parting scenes and enthusiasm which it is far from useless to reproduce. Over and above the interest they excite, one may thus collect almost officially documents which will be invaluable for the history of our times. Among the military baggage I have seen an object glass, which was likewise going to make the campaign. The example given by Mr. Fenton in the Crimea will not, therefore, want imitators in Italy. Thanks to photography, we may be able to get official portraits of all the personages who may be destined to play an important part in the moving drama about to commence, perhaps even now begun, on the banks of the Ticino. The greater part of the *ateliers* have already been put in requisition by a vast number of soldiers of every grade, who, before embarking for Genoa, or traversing the Alps, desired to exchange their portraits. I give you a photographic anecdote, for the authenticity of which I can vouch. A photographer, some of whose works figure in the Exhibition at the Palace of Industry, was called upon by a man who fills a distinguished position in the world, who asked him what a portrait (negative) and two proofs would cost, and was told, "The price of the portrait will be thirty francs, and the two proofs ten francs." "Very well, let me sit and you will give me two," replied the inquirer. Some days later this order was duly delivered, only a difficulty arose with respect to the price. The party photographed was surprised that he should be aske d for fifty francs instead of twenty francs, pretending that he only meant to order the second proofs. Will you believe it, the photographer could not make this individual comprehend that he must pay the price of the negative, and was forced, to save any further trouble, to give way to the man, who persisted that he only wanted the second proofs. Another Bœotian lately wanted some visiting cards bearing his portrait, and called upon a photographer to ask the price. "Fifty francs a hundred," was the reply. "Very well, make me six." "Six! you mean six hundred, then?" "No, only six!" "Very good," said the photographer, who was so far in the wrong that he failed to make the individual understand that the cost of six would be pretty nearly the same as a hundred. When they were delivered, the disciple of Nièpce got three francs for the six proofs, "since," as the man of the visiting cards remarked, "that was at the rate of fifty francs the hundred." These anecdotes remind me of the parrot buyer. He was an Englishman, who haggled regularly every day for a week over the price of a superb grey parrot. "Oh! sixty francs, that is very dear," said he, with that accent with which we are all familiar. Finally, after a melancholy sigh, he one day appeared to have come to a grand determination. "Still sixty francs for the beautiful parrot?" he asked. "Well, well! *have him roasted, and give me a franc's worth; that will satisfy me!"*—*M. La Gavinie* in "*La Lumière.*"

Photographic Notes and Queries.

NEW DRY COLLODION PROCESS WITH LINSEED.

SIR,—From the commencement of your labours as a journalist, I have been one amongst the thousands of your readers. But not being afflicted with the *cacoethes scribendi*, I have hitherto refrained from addressing you. I am induced, however, at length to do so, in consequence of a letter from "M. M. D.," inserted in the "PHOTOGRAPHIC NEWS" of March 18th, 1859, in which he asks, on behalf of himself and others, for your advice as to the best dry collodion process. I have tried many—the honey, Fothergill's, collodio-albumen, &c., &c., and have, with all, occasionally met with success, but far oftener with failures. Do not suppose that these results have been from want of patience, or the common fault of "forsaking the old love for the new;" not so; each system has had from my hands a fair trial, and been found wanting. As regards the collodio-albumen process, although apparently easy, still its greatest admirers must admit that it is costly, and requires great care and delicacy in the manipulation, and that, in consequence of the perpetual uncertainty attending it in respect of blistering, creasing, &c., &c., it is (with all due deference to Messrs. Sidebotham and Woodward, in whose masterly hands probably any process would be good) to the amateur nothing but a delusion and a snare.

But, sir, I have discovered a simple, cheap, and infallible process; one which, in the hands of the veriest tyro who ever stained his fingers with nitrate of silver, will give results certain and excellent.

My system is as follows:—Linseed, 2 ounces; water, 1 pint; let it remain by the fire, *without boiling*, until it forms a strong mucilage; strain it from the seed and cool. When cold, strain again through fine muslin, and if not for immediate use, add a small piece of camphor; but I prefer it always fresh. Coat your plate with any good negative collodion; let it set well and sensitise in the usual manner; drain; immerse in water 15 seconds; drain; pour on the linseed two or three times, and set it to dry spontaneously. Note—do not use the same linseed for more than one glass.

The nitrate bath I use is—nitrate of silver, 12 parts; water, 200; acetic acid, G., 30 drops to 40. For developing I find the second solution, p. 160, vol. i., the best.

The picture with this process is always clearly distinguishable before developing. Allow me at the same time to say that many failures, both of amateurs and professionals, arise from their using too strong a nitrate bath. I have found that a weak one requires no washing, and gives better results; if the bath is sufficiently powerful to blanch the collodion, it is all that is required; let it be understood that I am now speaking of the dry process.

In conclusion, I beg to assure you that my system is no visionary nonsense, but *bonâ fide*, and if you think fit to publish this, I have the most perfect confidence that you as well as myself will receive the thanks of many of our unhappy, disappointed, brother photographers.

Nantua (Ain), France. W. W. Hughes.

THE FOTHERGILL PROCESS.

Sir,—I have been induced, in consequence of Mr. Keene's communication in the last number of the "News," to try the effect of the addition of 6 grains of chloride of ammonium to the ounce of the albuminous solution, employed in the Fothergill process, and am glad to be able to confirm all that has been said of the increase of sensitiveness acquired by plates thus prepared. I exposed, yesterday morning, eight stereoscopic plates thus treated, and brought home with me—after an exposure just one third less than would have been required for plates prepared with albumen alone—as many perfect negatives, with the middle tints exceedingly well rendered, and details, even of foliage in deep shade, well brought out. If the keeping qualities of plates thus prepared at all approach those obtained by the employment of Mr. Fothergill's original formulæ, the modification thus suggested will leave nothing to be desired.

I fancied that the formation of chloride of silver, caused by the contact of the preservative solution with the free nitrate in the molecules of the collodion film, might be prejudicial to the delicacy of the developed picture, but I cannot perceive, even with a lens of considerable power, the slightest appearance of granulation; in fact, I do not think that I possess any negatives, obtained even by the Taupenot process, of greater clearness and brilliancy than these. Upon the whole, I strongly recommend the addition of the chloride of ammonium to the albumen, since greater rapidity of action is insured, without the sacrifice of that gradation of tint, for which the Fothergill process is so remarkable.

In what way the preservative quality of the solution is affected by the addition of the chloride, remains to be proved; possibly the great increase of sensitiveness thereby acquired may render the imprisoned atoms more susceptible of change by those deteriorating influences which, even in darkness, are always at work; but, be this as it may, this modification is important and valuable.

I purpose, at the first leisure time that offers, to try some experiments with the gum arabic solution, which, I conceive may be destined to play a very important part in this process. With the *endosmic* property of gum water, under certain conditions, many of your readers are probably acquainted; this property, aided by the force of chemical affinity, which obviously exists between the nitrate and preservative solutions, may, eventually, conduct us to the comprehension of the *rationale* of this interesting process. W. L.

NOTES ON THE BLISTERING OF DRY PLATES.

Sir,—I see in No. 33 of your invaluable paper one who signs himself "Photo." in great trouble about his plates blistering; he cannot have more vexations than I have had from the same cause. It appears that none can thoroughly explain the cause of blistering. I am led to believe that it is the expansion of the albumen in becoming thoroughly wetted with the developing and washing, which causes blisters to arise; whatever is the cause, it is the greatest drawback to the dry process, and if you allow me a small corner of your paper, I will give "Photo." my plan of preparing dry plates, which prevents blistering and makes a negative which, I think, will equal any:—

Clean your glass well, slightly warm it, and coat with—

Gelatine	33 grains.
Water	2½ ounces.
Alcohol	½ ounce.

Drain it well off and dry thoroughly; this must be slightly warm. Coat with a thin collodion; sensitise in a 35-grain nitrate bath, slightly acid with acetic acid; wash your plate in clean rain water until all greasiness disappears; drain for a minute, and coat with the albumen of two ordinary sized hen's eggs, water two ounces. Work it round your plate for one minute, drain off and wash your plate, set up to dry in the dark, and when thoroughly dry it is ready for exposure. Water must not be poured on the plates to wash them; get two toning baths, and put as much water as will make them about ⅜ of an inch deep, and wash off the nitrate in one, and the albumen in the other, by putting in the plates and waving the water over them; rather over-wash than under; change your nitrate washing water every six stereoscopic plates, and your albumen washing water every three plates. Develop with—

Pyrogallic acid	1½ grains.
Water	1 ounce.
Acetic acid	20 minims.

For a stereoscopic plate, put fully an ounce of your developing solution in your developing glass, and add about eight drops of your nitrate bath; go on with this until all your details are fully out, wash out your glass, and put half an ounce of developing in, and add 8 or 9 drops of nitrate bath; this should bring up the desired intensity. Fix with hypo. or cyanide, either will do; I use cyanide 10 grains to the ounce of water. W. A. Young.

Haddington.

PORTABLE STAND FOR A DEVELOPING BOX.

Sir,—I have a plan which I can recommend to "P. F. P.," p. 23; it is rather a lazy looking one however. Procure a fold-up seat, which when shut up is a little (say 6 inches) shorter than the length of the developing box; then cut down the legs of a large tripod to the length of the box, so that they may go inside. The stand being so much nearer the ground, does not, of course, vibrate so much, and I found one could work very well sitting down, the bottom of the box being just so high that one's knees could go under it.

H. S. I.

CLEANING DAGUERREOTYPES.

Sir,—I have cleaned and restored faded daguerreotypes with great success by washing with the cyanide fixing solution, and then well washing and drying. I don't think anything else is required, unless they are very bad, and then I am afraid their case is hopeless. T. Millard.

Stratford.

SILICIC ETHER AS A VARNISH FOR NEGATIVES.

Sir,—My attention having been engaged on the old subject of "varnish," I think the following might be useful to some of your numerous subscribers. It consists in a solution of the silicic ether, $3\ C_4\ H_5\ O.\ 4\ Si\ O_3$: it is solid, hard, and perfectly transparent; dissolves freely in alcohol and ether; and is unaffected by most chemical reagents, hence its use in varnishing baths, dishes, &c. It might besides be used as a species of collodion. Its value as a negative varnish is obvious, as it is colourless, free from stickiness, and drying without the application of heat, becomes almost like glass. It would, undoubtedly, be of great use if prepared sufficiently cheap. Should this prove of enough interest to merit a place in your valuable journal, I shall be happy to send you its mode of preparation.

H. C. Jennings, Jun.

[We shall be glad if our correspondent will forward the mode of preparation of the silicate of ethyl. Ebelman, in 1846, described a bi-silicate ($C_4\ H_5\ O.\ 2\ Si\ O_2$), which answers to the description given by our correspondent, but its preparation is attended with a great amount of difficulty. We were not aware that a compound of three equivalents of ether and four of silicic acid had hitherto been discovered, and shall be glad of further information on the subject.—Ed.]

PHOTOGRAPHIC MEMORANDA.

It has been pointed out to us that we should confer great service on photographers generally, if we were to publish a short list of such items as it would be desirable to write on stereograms or other photographs—such as the quality of light, season of the year, lens employed, width of separation, and of the two stations.

If our correspondents will forward to us the heads of any data which they think it would be desirable to record in this manner, we will consider the matter, and publish such a list as we can recommend in an early number.

ANSWERS TO MINOR QUERIES.

Detection of Water in Alcohol or Ether.—*G. W. C.* The presence of water in either of these two bodies may very readily be detected, by allowing a drop of the suspected liquid to fall into a little pure benzol. On shaking them together, water will be shown by the liquid becoming turbid and milky; whilst, if the alcohol or ether had been anhydrous, it would have remained quite clear.

Drying Bottles.—*Toby N.* asks how we recommend him to make a bottle perfectly dry inside after being cleaned in the manner recommended in vol. ii. p. 60. He is desirous of keeping a stock of clean bottles for any emergency; and if they were, at the same time, perfectly dry inside, instead of damp from the remains of the last washing water, they would do for putting collodion in, or any other liquid which would be injured by the presence of water. A bottle may be very easily dried in the inside in the following way:—After having cleaned the bottle perfectly, and drained it well, take a piece of glass tubing, about half as long again as the bottle, and having held the latter near a fire until it is as hot as the hand can bear, introduce the tube as far as it will go, and, applying the mouth to the other end, draw air through it for some time. The heat causes the greater part of the water to assume the state of vapour, which will be removed, as soon as formed, by sucking through the tube. After air has been drawn through for some minutes, heat the bottle again, and repeat the operation, and the moisture will soon disappear from the interior. If a drop of water still obstinately remains, it may easily be removed by placing one end of the tube close to it, and drawing air through by the mouth at the other end. The rapid evaporation of the water, under the powerful current of air thus made to pass over it, will soon take place.

Splitting off of the Film.—*Verger.* One great disadvantage of most of the methods which have been recommended for converting positives into negatives is, the liability of the film to contract so much on drying that, in many cases, the film curls up, and splits off in large patches over the plate. Frequently on examining a plate which has been intensified with gold or bichloride of mercury, and then reared up to dry, the film looks quite perfect; but the very act of moving it from the position in which it dried, suffices to destroy the continuity in some point of the surface, and, once broken, the entire film begins to split in every direction. If *Verger* can manage to get the varnish on the plate before the splitting commences, the picture will be safe; but we have frequently taken up an apparently perfect plate of this kind, and, just as the varnish was being poured on, have been forcibly reminded that, "there's many a slip 'twixt the cup and the lip," by the spontaneous destruction of the film before our eyes.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Vaporisation.—Faraday has described, at vol. i. p. 70 of the *Journal of the Royal Institution*, some very careful experiments, by which he has shown conclusively that nitrate of ammonia, oxalic acid, perchloride of mercury, and, *perhaps*, oxalate of ammonia, evolve vapours at the ordinary temperature.

J. Greenhalgh.—Perchloride of mercury will dissolve in pure water, in alcohol, or in turpentine. One of these three solvents might, possibly, answer your purpose better than hydrochloric acid. We shall be glad to know what success you meet with in the experiment.

Fraximus.—You will not be able to convert your pair of single achromatic lenses into a portrait combination. The curvatures of the component glasses in the two cases are entirely different, and require to be calculated with a special reference to the work they are intended to perform. Such a series of articles may perhaps be given at some future time.

Clarde.—We will do as you request. The stereogram being one of the first you have ever taken, is very creditable, and shows no particular faults of chemistry or manipulation, other than may be remedied by a little experience. The lens is a very good one; but the aperture is rather too large. We will draw up a few memoranda to give with photographs.

Nemo.—It is a pity our correspondent has not some better employment than that with which he has lately occupied himself.

J. G.—We think it will be best to have the roof of your glass house made "ridge and furrow" fashion, as in the building for the Great Exhibition.

J. C. S.—Perhaps you immerse the coated plate too soon into the bath; that is the only remedy we can suggest, from what you mention.

A Pupil.—We prefer the pyrogallic developing solution for negatives; although some operators succeed habitually in taking excellent pictures with a sulphate of iron developer.

Anti H.—We will give you the information you require, if you forward us a stamped and addressed envelope.

London.—Sulphate of baryta, although not *perfectly* insoluble in water, is as nearly so as any salt with which we are acquainted. Thus, sulphate of strontia, which is usually deemed to be insoluble, will still dissolve to a sufficient extent in water to give a precipitate with chloride of barium. For all practical purposes, however, you may consider that the sulphates of both strontia and baryta are insoluble.

Euxesis.—You have, doubtless, used the chloride of gold in an acid state. Make it faintly alkaline with carbonate of soda, and you will no longer meet with the difficulty.

H. N. E.—Increase the strength of your nitrate bath.

Pyro.—Received.

A. X.—Your stereograms are very beautiful, and we are much obliged for them. They would, however, be much more interesting, were a description of the scene they are intended to represent appended to each print.

H. C. R.—Your silver bath is too weak; increase the strength, and the mottled appearance will cease.

V.—1. Very dilute nitric acid. 2. Yes. 3. Thirty grains to the ounce. 4. Either No. 2 or 3.

J. F. Taylor.—Received with thanks.

Δ.—You will not succeed very well at taking negatives with positive collodion and developing solution; you should employ collodion prepared on purpose for negatives, and develop with pyrogallic acid.

D. F. L.—Spanish white is carbonate of lime.

Querist.—Do not build your operating room at a greater height than will be sufficient to prevent the light which should come to it from being obstructed by surrounding buildings.

H. M. L.—The front lens of a portrait combination may be used for landscape photography, if fitted into an appropriate mount, with the convex side turned toward the ground glass of the camera; but such lenses are not so good as those made especially for landscape purposes.

Reading.—The lens you call No. 3 is the best.

N. A. D.—A method of splitting paper was given at vol. ii. p. 36.

Col. Alb.—Mr. Keene has written some excellent articles on the Fothergill process in several numbers of the "Photographic News." We cannot do better than advise you to study the letters by this gentleman.

F. Walker.—The substance remaining behind, on dissolving your silver in nitric acid, hardly deserves the name which you have applied to it. *Some* people, doubtless, would agree with you, and style it "dirt;" but more worldly-minded persons would call it one of the precious metals—metallic gold.

Done.—We quite agree with you that such conduct is grossly dishonest, and if it be in our power, we will put a stop to it; but we fear that nothing we can say will quite prevent such conduct.

Lens.—1. Aplanatic. 2. Add a few grains of metallic cadmium to your red collodion; the metal, having an affinity for iodine, will absorb it, with formation of iodide of cadmium, which will dissolve in the collodion.

Communications declined with thanks:—Fox.—Maby.—F. L. M.—J. S.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—H. S. Smith.—A J.—L. H.—Y. A.—Amateur.—Cato.—T. L.—R. W. G.—Deliquescent.—F. G O.—S. B. G.—No. 32.—F. and T.—B. M.—Q. U. O.—P. A. A.—An Engine in a Fog.—Oxide.

In Type:—A. Keene.—Inquirer.—J. W. W.—J. B.—Viator.—A Kerry Man.—Thomas Barrett.—O.—John Sang.—An Amateur.—N. T. A.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

VOL. II., No. 38.—*May* 27, 1859.

NEW PROCESS OF PHOTOGRAPHIC ENGRAVING.

BY M. BERCHTOLD.

THE heliographic process, invented by Nicéphore Nièpce more than thirty years ago, has been the starting point of all these beautiful discoveries which have raised photography to a point of perfection which could not have been hoped for fifteen years ago. Nièpce had, since the above date, attempted to engrave photographically, and this desideratum, at which he had already partly arrived, in 1829, is not yet completely attained.

The results obtained by Nièpce were very excellent in a photographic point of view, and the means by which he reproduced either a design or an engraving or a view in the camera, were even then so perfect that it seems surprising that they should have been so long laid aside.

The proofs which are obtained by employing the process of Nicéphore Nièpce are very fine, especially if, instead of ordinary designs or engravings, positive or negative photographs are employed; but there exists a great difference between these proofs and the photographic image, properly so called.

It is important to point out this difference, in order to understand the theory of heliographic engraving.

The photographic proof is formed by the colouration of the substance employed under the influence of light: the varying intensity of which gives more or less force to the tones of the image, and consequently adds roundness and effect.

In heliographic images, obtained by means of bitumen of Judea, this is not the case; the image is not formed by the colouration of the substance, but the varnish is modified by the action of the light in such a manner (possibly by a sort of desiccation or change in its molecular constitution), that it becomes more or less soluble, according to the intensity or duration of this action; by means of a subsequent washing with an appropriate solvent, the parts of this varnish that have not been attacked by the light are entirely dissolved, whilst in those parts which have been impressed there is a proportionate action.

The gradation of tint, which is very perfect in these images, is therefore due to a greater or less thickness of varnish, and not to its colouration, which is sensibly the same after as before its exposure to light.

In the numerous attempts at engraving, which have been made since the time of Nièpce to the present day, the metal which has been left bare in the dark parts of the design has been attacked and etched by an acid or by galvanic agency; and in order to give the plate the necessary grain for it to hold the ink, recourse is had to a process employed by engravers, which consists in covering the plate with a fine dust of resin, which is made to adhere to the metal by heating it, and which thus protects it from the action of the acid.

In reflecting on this process, and on considering the manner in which the half tones of the photographic image are formed, it is not difficult to understand that this powdered resin, which is spread equally over the whole surface of the plate, has a peculiar effect on these half tones, which are already covered with a certain thickness of varnish. On this account the results have never been satisfactory.*

Preoccupied with this inconvenience, I sought to produce a *grain* (which is indispensable, for it is only by offering a rough and granular surface that the metal will retain the printing ink) direct on the photograph; and after many attempts I succeeded in producing it on the positive proof by piercing it through by means of an engraver's *roulette*. This process, which gives a grain of admirable firmness and regularity, has furnished me pretty good results.

This process offers many important advantages: in the first place it simplifies the heliographic operations, since the exposure to light gives immediately a complete image, such as the acid will subsequently form in biting in the metal; besides which it admits of the employment of caoutchouc to consolidate the varnish, which cannot be employed when recourse is had to heat to form a grain with resin, since the caoutchouc is disorganised by the high temperature necessary.

I must remark that the proofs obtained are absolutely untouched, and that the biting in with dilute nitric acid has only been performed once; that is to say, that I have not employed a means which doubtless succeeds in the hands of a skilful artist, but which ought not to be employed in heliographic engraving processes.

This means consists in coating with a brush dipped in varnish, after the first biting in, those parts which are considered sufficiently black, so as to etch again those parts which want more force, and in performing this operation several times so as to attain vigour from an originally feeble proof.

This method, I repeat, may give good results, according to the talent of the engraver, but it does not constitute a process; it demands artistic talent, and is one of the ordinary processes of the engraver, and we all know what it is capable of yielding in the hands of a clever person. I think, then, that it can only be applied to heliography as an expedient, and I have, therefore, not wished to make use of it.

I have deemed it my duty to communicate these experiments, because they have given me results which may already be looked upon with interest, although I am convinced, from numerous trials, that this process, although preferable to the employment of powdered resin, is still very incomplete, and does not permit us to hope for the exact reproduction of a photograph with all the gradations of tint which constitute the rotundity of the image, and without which an artistic image cannot exist.

After experiencing many failures, I have then been forced to admit that these different plans are incomplete, defective, and I will say, almost impossible; and I am obliged to conclude that heliographic engraving, whether on copper or otherwise, by the employment of resins or bichromate of potassa, or even when taken on a plate of silver by the daguerreotype process, cannot give good results, except the photographic image (which is very perfect by either of these methods) is modified in some way, that each particular tone of the image may be represented by a different result (whether this be in grains or in lines).

It is indeed evident that since the final result is the obtaining of an impression by means of printing ink, it is necessary that the blackest parts of the picture should retain more ink than the other parts; and a simple inspection of an ordinary engraving will show that a dark effect of greater or less intensity is produced either by lines of a greater or less size, or more or less approaching each other, or else by a grain more or less separated in different parts.

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* NOTE BY DAGUERRE ON THIS SUBJECT.—"Although M. Nièpce here speaks of iodine to darken and acid to engrave, these two operations have not given any gradation of tint. Indeed, the image being formed of the greater or less thickness of varnish, according as it is more or less attacked by the light, it is impossible that the acid should act on the metal in the same proportion. Thus it is that M. Nièpce has never made an engraving of a proof obtained in the camera." (*Historique et description des procédés du daguerreotype, par Daguerre*, 1839.)

The formation of the heliographic image being very satisfactory, the problem to be resolved appears to me to be the following :—

To add to this image an effect of lines or grains, which should be appropriate to the different tints of the design, and differing for each tint, so as to preserve the proper relation between them ; but the skill and intentions of the artist should have nothing to do with the arrangement of the granulation, or with the luminous action which is alone able to produce the result ; in a word, light alone should augment or diminish the number of the strokes, and make them wider or closer, according to the requirements of the half tones.

I have just succeeded in effecting this—the strokes, differing according to the depths of the tone, becoming modified by the sole action of the light, and being more or less close and numerous according to the varying intensities of the different tones in the picture.

PROFESSOR BRODIE ON GRAPHITE.

Now that photographic printing in carbon is attracting some attention, we are induced to lay before our readers the following account of some important researches of Professor Brodie on graphite—the allotropic form of carbon which is likely to prove most useful in this branch of photography :—

On Thursday evening, 19th inst., Professor Brodie, of Oxford, delivered, at a meeting of the Chemical Society, a highly interesting lecture on the varieties of graphite, or blacklead, detailing the results of more recent experiments by which he has established the existence of certain compounds of graphite. From an examination of the structure and properties of the several native and artificial varieties, Professor Brodie is inclined to divide them into two classes, of which the Borrowdale pencil lead and that from Greenland constitute the soft, *amorphous* representatives ; while those of a platey structure, *exhibiting cleavage*, were more allied in character to the scales of graphite as they occur in cast iron. Under this second series are included the blackleads imported from Ceylon and New Brunswick, forming by far the larger proportion of those met with in commerce, and used for the ordinary purposes of coating iron work.

The lecturer next alluded to the well ascertained fact of the coke or "carbon points" employed in the production of the electric light becoming converted at their heated extremities into a description of amorphous graphite, resembling the finest Cumberland specimens, and he then exhibited the power possessed by one end of making a pencil streak upon paper. The alteration produced in the diamond by the action of heat was also attended with a conversion from the crystalline into the graphite condition of carbon, and seems to indicate that the latter is the most permanent state in which the element carbon is known to exist.

Professor Brodie described and experimentally exhibited his process for purifying the ordinary qualities of blacklead, and separating from them the silicious and other matters with which the native forms of graphite are nearly always intermixed. The treatment consists in digesting the crude blacklead in mixed nitric and sulphuric acids, whereby not only are the metallic impurities partially removed by solution, but the carbon, by assimilating the elements of water, becomes converted into a compound for which, at present, he could give no definite expression. Without alteration in physical appearance, a substance is produced which exfoliates in a remarkable manner on heating in a crucible—a change which has perhaps its best parallel in the action of heat on the orange crystals of bichromate of ammonia, whereby a condition of sesqui-oxide of chromium, very much resembling green or mixed tea, is produced, with an enormous increase in the bulk of material. Graphite which has undergone this change of volume is now so light that it will float on the surface, or remain suspended in water, so that by washing and decantation the heavy particles of sand will quickly subside, and be in this manner removed. The product answers to the description of pure carbon, leaving no appreciable amount of ash on incineration, and by compression yields a block equal in quality to the finest description of native blacklead. Professor Brodie pointed out the applicability of his purified graphite to the glazing of the coarser kinds of gunpowder, used for blasting ; and recommended its use, as a lubricating material, in all cases where freedom from grit was of the first importance.

By the repeated action of nitric acid and chlorate of potash graphite becomes slowly changed to a *nearly white* substance, having the composition $C_{11} H_4 O_5$ (this formula being interpreted according to the view of atomic proportions, which requires 12 as the combining weight of carbon). The action of dilute ammonia, by which it is gelatinised, and the result of exposure to heat, when an exceedingly light form of carbon is produced, are among the most striking characteristics of the new body.

The lecturer concluded by referring to the theoretical considerations enunciated during the progress of these researches, and drew a comparison between the properties, physical and allotropic conditions of the elements, carbon, boron, and silicon, as brought to light by recent discoveries in this direction.

COMPARATIVE EXPERIMENTS OF SOME OF THE DRY PROCESSES.

BY MR. A. KEENE.

THE following abstract of the discussion that took place among the members of the Charlton-upon-Medlock Society, after the paper sent by Mr. Draffin "On the Comparative Experiments on some of the Dry Processes" had been read by the Chairman, may materially alter the opinion of the relative value of the processes intended to be conveyed by it.

The Chairman invited discussion, which he said must be short, as the time of the meeting was so far advanced.

Mr. Hooper was sorry to differ with an old friend, but he thought Mr. Draffin was wrong in stating that Taupenot's process was more sensitive than Fothergill's. He also could work both processes, and must be allowed to say that he found Fothergill's the better also for other reasons ; and *submitted that the prints by Mr Draffin proved it*, particularly the View of York ; *the Fothergill side was full of detail and half-tone ;* the Taupenot side was without detail in the foreground, whilst the development had been carried so far that the distance was fading away.

Mr. Fawcett always found Taupenot's plate less sensitive than Fothergill's, but much easier to manipulate. The more you washed it the better it was, but he could never get it in the camera as quickly as Fothergill's.

Mr. Rogerson brought two negatives and some prints, the first production of an amateur who had just commenced Fothergill's process, to show what could be done at once by it.

In addition to the above, which need no comment, and are fully borne out not only by my own experience, but by that of numbers of others whose communications I have now by me, I would draw attention to a few apparent discrepancies ; in Mr. Draffin's prior communication on the same subject, we are informed he purchased the Fothergill process plates *ready prepared ;* in the present one, we are led to infer that they were prepared by himself in the various most approved ways ; again, at the commencement of the present paper, it is stated that all three processes—Fothergill, Taupenot, and Hill Norris—are exceedingly good, and especially so for out-door practice ; in fact, for this purpose, there is little to choose between them when properly manipulated ; in the comparative experiments given, under these circumstances, the impression is conveyed that the Fothergill not only required nearly double the exposure, but that the results were even then inferior. Are we here to conclude manipulation defective?

The lecturer, in reciting the advantages of the Taupenot process, mentions that eighteen plates may be prepared in an hour, but forgets to state they are only *half* prepared, and require, before being ready for use in the camera, a second immersion in the sensitising bath, a second washing, drying, and baking. Again, referring to the advantages they offer to those going long journeys, from the fact that they keep when *unsensitised* for an almost indefinite period, and do not suffer injury from exposure to light, he omits to notice the very important fact that, before they can be used, an immersion in the sensitising bath, as well as thorough washing, drying, &c., are necessary, necessitating either taking the bath solution or preparing it—not an easy matter always when on a tour, nor is it easy to obtain conveniences for washing, drying, &c.—nor a developing solution to develop, &c.; in fact, the whole paraphernalia requisite for wet process excepting collodion is difficult to procure.

The lecturer states that, for the Taupenot process, there need be no running about for a particular collodion, for any kind will do; his experience here certainly differs from that of most others who have found, at the cost of not a few failures, that it must be a short, powdery, non-contractile kind, or the picture will be covered with blisters; this kind, as is well known, does not answer for the wet process, as it gives no middle tone, but blacks and whites; here I maintain the Fothergill process has a decided advantage, the collodion that answers best for it being equally good for the wet process; it also has an advantage in its keeping properties—compared with a sensitised Taupenot—also in preparing for ease, shortness of time, and small quantity of water required—the latter, at times, no little advantage—as well as shortness of time occupied in developing, instead of, as in Taupenot, requiring sensitising, well washing, carefully coating with albumen to avoid air bubbles—certainly demanding as much attention as the use of the four drachms of water in Fothergill's process—drying and baking, again sensitising, washing, drying (and baking *optional*). We have in Fothergill's process, a sensitising, diluting bath on surface of plate with a measured quantity of water, coating with albumen, washing, drying (and film drying with artificial heat *optional*).

We have had published evidence that Fothergill's plates have kept two months in the warm weather, and I have myself had evidence of their keeping uninjured respectively from October till March, and September till April.

I should be sorry in any way to infer that Mr. Draffin is not acting *bonâ fide*, or does not really believe what he states of the processes; but, with the evidence before us, we can certainly draw no other conclusion, but that he has either operated upon badly-prepared plates, spoilt them by *over*-exposure, or is so biased in favour of his favourite process, that he cannot—as in the case of the View of York, mentioned by his friend Mr. Hooper—appreciate the superiority of the Fothergill process.

A METHOD OF OBTAINING PURE SILVERY WHITES IN COLLODION POSITIVES.

BY MM. DAVANNE AND JOUET.

Collodion positives do not always present the metallic silvery whiteness that operators desire; the tint being often more or less dingy and dark, and far from presenting the desired appearance. In some experiments, we have obtained positives which have appeared to us to be more brilliant than the generality of those obtained in the ordinary way; the process, however, presents no new points; it consists merely in the addition of a certain quantity of sulphuric acid to the iron bath, and therefore is similar to a host of formulæ already published. If, therefore, we have obtained superior results, it arises from our having based our formula on the elementary laws of chemistry, instead of employing an empirical formula.

In order to obtain a brilliant metallic white it is necessary that the molecule of silver which is deposited to form the image should be as pure as possible; what, therefore, takes place when we develop a picture?

The oxide of silver in the nitrate is decomposed by the sulphate of protoxide of iron, and whilst the silver is reduced to the metallic state, the sulphate of the protoxide becomes sulphate of the peroxide. But the sulphate of the peroxide of iron, which is thus formed, is basic and insoluble; it consequently *envelops*, so to speak, the molecule of silver which deposits at the same time with it, and communicates to it a part of its ochery tint. Instead of an insoluble basic sulphate of the peroxide of iron, it is, therefore, necessary to obtain a neutral sulphate which is soluble in water; but this latter can only be formed if a certain quantity of sulphuric acid be added to the bath of iron. It is easy to determine the exact quantity necessary to add to the bath in order to produce a brilliant silvery surface, by the following formula, which indicates all the stages of the reaction:—$2\ (Fe\ O.\ SO_3) + Ag\ O.\ NO_5 = Ag + NO_5 + Fe_2\ O_3.\ 2\ SO_3$.

The composition of soluble sulphate of peroxide of iron being $Fe_2\ O_3.\ 3\ SO_3$, it will be seen that one equivalent of sulphuric acid must be added for every two equivalents of sulphate of protoxide of iron, or in weight 6·12 grains of sulphuric acid for 26·87 grains of crystallised sulphate of protoxide of iron.

In practice, and in order to use round numbers, it may be said in a general way that the quantity of sulphuric acid should be one-fourth of the weight of the sulphate of protoxide of iron employed.

The following is the formula we have used:—

Common water	200	parts.
Alcohol	10	,,
Acetic acid	10	,,
Crystallised sulphate of iron	4	,,
Sulphuric acid	1	,,

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued)*.

Backgrounds.—Continue as much as possible to make the background recede, that the face may come well out. All greys and browns recede; all warm colours—reds, yellows, &c., come out. Any very impressive colour in the background, or any striking object, acts contrary to what is intended, by forcing itself upon the eye and attention; in fact, every part of a picture should be made subservient to the effect of the figure: and none of the accessories should be made so impressive as to be seen before the principal object—*the head.*

A background should be made to assist the artist in producing a certain picturesqueness of effect, by means of light and shade; in those parts, where, to produce relief in one part, it is necessary to sink in another, there shadow is necessary. When, on the contrary, that part which is intended to come out tells strongly against some light introduced in the background behind, a fine effect is produced.

Where, in reference to the colour, you wish to develop a figure having, for instance, a warm complexion, with drapery composed of bright red, yellow, or the like, you will find the greatest amount of relief result from a bluish sky; still, have no crude blue, but rather let every object, every tint of colour intended to recede, which all are, more or less, in backgrounds, be softened into a greyish hue. For a warm complexion, some degrees of olive are suitable; yet this should not be crude, but rather softened with a warm grey or brown.

When the background is defective in the photograph, having marks, &c., resulting from a defective negative, a little of some opaque or body colour may be used; lay on the colour thinly, and finish with transparent colours; always observing, as a principle, that the under colours should be grey; a background, like most other passages in a picture, may be made to appear more racy and effective by working warm colours over grey ones.

But, glaring red curtains, painted up to the highest pitch of gaudiness, with blue skies, as bright and strong in colour as ultramarine will make them, are all in bad vulgar taste, and no more conduce to the effectiveness of a picture painted according to nature in other respects, than a screeching blast, blown by some bad player, from a horn, would contribute to the beauty of a chord in music.

A picture, whatever the subject, should possess the leading attributes of brilliancy, richness, harmony, softness, and tone. Brilliancy is the purity of each colour, without crudeness; richness, the representation of colours made mellow; softness, the nice gradation of the degrees of colour, light and shade; harmony, the arrangement of colours by the side of each other, so that they shall one seem to assimilate with the other, and that, however opposite in their natures, they may appear to be lighted by the same source, and belonging to the same piece; whilst tone is that quality which gives to a work a decided nature—as for instance, some pictures are said to be of a "pale tone," some of a "rich tone," others of a "mellow tone," some of a "deep tone," so that a picture wherein every object was imbued with mellow browns in their shadows, and mellow, creamy yellow lights, would be considered of a "fine warm tone" as to colour, and as to light and shade, when the same principles were used in the just arrangement and gradation of lights and shadows.

It is necessary to make this clearly intelligible, that the student run not into a common fault of painting various objects in one work too crudely; for although, by contrast, every object may appear to possess only its own colour, *it is, nevertheless, so affected by surrounding objects reflecting their colours upon it, and all receiving one general tone from the general nature of the place wherein they are situated, as, to a certain extent, to partake of some of each other's colours*, so that painters, to represent this effect, have, some of them, especially the old masters, a practice of painting their pictures often in brown and white alone, embodying therein the different local colours; and as local colours are represented in the intermediate spaces between light and shade, both all the high lights, and all the deep shadows, are of one uniform colour, which produces a wonderful tone. This principle is variously applied; by Rembrandt, perhaps, with perfect success.

It will be evident, upon experiment, how much of the charm in old pictures is due to this; for, although time has evidently aided in producing the same effect, they bear witness to this principle having been much known and practised.

We have seen pictures by the old masters, wherein it was found, upon removing the rich outer coat of glazing, that they had been painted entirely with brown and white, and the local colours laid on afterwards (more strength being given in the half tints than elsewhere) in a transparent medium. This was entirely the process with respect to some draperies, the intense shadows being glazed afterwards with asphaltum. To apply these observations to our present purpose, let the brightest lights and deepest shadows partake of a similarity of colour. In some pictures by our best miniature painters, there is as much tone as in any oil painting. In some very fine ones, remarkable for brilliancy of colour, the shadows are of a yellowish-brown, even the shadows of blue drapery, the lights being made of yellow, red, and white.

But those who would prove the truth of this important principle, should place a picture thus treated by the side of one wherein the local colour is carried throughout objects, where the effect is dead and heavy. All appears dark on account of the imperfect imitation of the effects produced by light. The effect is dead and heavy. The shadows vary from the lights in nothing but depth, and seem to have the same colour intensified; the lights, too, are equally crude. Every object in such a picture will appear as though it had been steeped in a dye trough, and as if no light had ever shone upon it. Whilst the other picture steals upon the eye in soft harmony, as steal melodious sounds in rich concord upon the ear.

And, moreover, as so much of the picture is subdued, what real colour there is will appear to greater advantage, than if gaudiness and crudeness pervaded throughout.

There are painters so ignorant of or opposed to this method of treating a painting, that in representing a piece of (say, blue) drapery, they make it light blue in the lights, darker blue in the half tints, and in deep shade the deepest blue they can make it.

It is often found that such coarse treatment arises from a corresponding want of nice feeling on the part of the painter, coupled with an incapacity to see delicate effects of colour; for no man is expected to represent that which he does not see.

(To be continued.)

Dictionary of Photography.

Citrate of Soda is frequently used in photography. It may be prepared by saturating carbonate of soda with citric acid, and evaporating to the crystallising point. On the small scale, it may be very conveniently prepared by dissolving 112 grains of pure citric acid and 133 grains of pure dry bicarbonate of soda in a little water.

Citrate of Silver falls down as a white insoluble powder, when a soluble citrate is mixed with solution of nitrate of silver. This salt is of interest to photographic chemists, as forming the starting point in the preparation of the curious but little studied salts of suboxide of silver. If dry citrate of silver be heated to the boiling point of water, and a current of dry hydrogen gas be at the same time passed over it, it becomes partially reduced, and a brown powder is formed, which, according to Wöhler, is a citrate of suboxide of silver. This salt dissolves in water, forming a red solution, from which other sub-compounds of silver may be formed. It is on account of this remarkable re-action that Mr. Hardwich was led to the employment of citric acid in the ordinary processes of photography. Our correspondent, Θ, gave, in our second volume, p. 49, a very excellent negative printing process in which citrate of soda was used; and the addition of the same salt to the ordinary alkaline chloride used in the preparation of the "salting bath" in the positive printing process, is, by some, considered a great improvement. Mr. Hardwich has also recently introduced this salt into the toning bath; he takes—

Terchloride of gold	1 grain.
Sesquicarbonate of soda	1 drachm.
Citric acid	20 grains.
Water	12 ounces.

This bath will not keep long when mixed, and is very complicated in its employment; it being necessary to use it at a certain temperature, and allow the process to proceed whilst the metallic gold is in the act of being precipitated from the solution by the reducing agency of the organic acid present. Doubtless, in the hands of a very skilful and experienced manipulator, this process is capable of yielding excellent results; but, judging from the numerous specimens which we have seen of its action in the hands of an amateur, we are inclined to recommend the process given by Maxwell Lyte in the "Photographic News," vol. i. p. 301.

Collodion.—This name is given to a solution of gun cotton in ether. By the evaporation of the solvent, the gun cotton is left behind in the form of a tough transparent skin, insoluble in water. It was originally employed to pour over wounds, &c., in order to form an artificial skin to protect them from contact with the air: it was, however, soon applied to photography. Like albumen, it gives an insoluble film, which serves as a support for the sensitive material. The characteristics of a good collodion, for photographic purposes, should be the following:—It should be sufficiently fluid to flow readily and freely over the plate, and in it should be dissolved iodide of potassium, ammonium, or cadmium, &c., in such quantity as to produce, by double decomposition with the nitrate of silver in the bath, a thin layer of iodide of silver. If there be too much iodide, the film comes off very easily; if, on the contrary, there is not sufficient, the sensitiveness is impaired: knowing this, it will not be difficult to arrive at the proper medium. In order to avoid spots, it is imperatively necessary that the collodion should be absolutely free from floating particles; the best way of effecting this is, to keep it in a large bottle, and every morning carefully decant the upper portion into an absolutely clean bottle for use. At the end of the day, the portion unused should be poured into another bottle, from which it may, as it gets full, be again decanted for use. *Iodised* collodion will not, generally, preserve its sensitiveness unimpaired for any length of time; it seems to alter in proportion as the iodide itself is easily decomposed. The reasons for this decomposition are, as yet, but very imperfectly understood, although they have been carefully investigated by many clever chemists, amongst whom, Mr. Hardwich, perhaps, stands foremost.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 24, 1859.

We have concluded our remarks upon the Paris Exhibition of Photographs; but in the course of our weekly notices we shall doubtless have occasion to refer again to many of its minor details.

It will be seen from our preceding letters on this subject, that the eminent photographers of the day whose works are exhibited here, may be classed in different categories according to their peculiar style of art. Thus, for *landscapes* we have Messrs. Roger Fenton, Braun, Morgan, Margantin (who has exhibited the most beautiful study of an elm tree we ever remember to have seen), Maxwell Lyte, Civiale, D'Aguado, &c. *Geographical proofs*, views of cities, &c., form the bulk of the collections exhibited by Messrs. Graham, Stahl, De Campigneulles, &c., whilst the *monumental style* has been adopted by MM. Bisson, Baldus, Dr. Lorent, Naya, and others. Some photographers appear to devote their art entirely to the *reproduction of pictures or engravings;* such are Messrs. Bingham, Caldesi, and Montecchi, Fierlants, and Bilordeaux; whilst *portraiture* is represented by MM. Nadar, Warnod, Legray, Pesme and Varin, and Salomon.

MM. Nachet, Bertsch, and Bernard have adopted *microscopic photography*—that is, the production of magnified proofs of minute natural objects—as their style. Messrs. Pouncey, De Beauregard, Salmon, and Garnier, and a few others are devoted to what we may term *experimental photography;* and under this denomination we may class the works of those artists who endeavour to apply photography to the useful arts. M. Dufresne, for instance, has been very successful in this way. He has exhibited a large steel shield, most admirably engraved by heliographic means; Madame Laffon's screens, spoken of in our last letter, are another instance.

In original subjects, or what we term *photographic de genre*, Mr. Robinson stands decidedly foremost. We feel the want here of Mr. Rejlander's proofs. He has not exhibited. M. Alophe, of Paris, has replaced him, at least in one of his proofs which he calls "La Gloire et le Pot-au-feu." It represents a young painter in his studio. He is seated, with a clay pipe in his mouth, before his canvas, from which he has turned for an instant to observe the progress of his dinner, cooking on the stove beside him. In one hand he holds his pallet and brushes, whilst the other is employed to raise the lid of a saucepan in which the soup is boiling. This proof is taken from nature.

The *Société Française de Photographie* has just published its report, read at the last meeting by M. Perier, on the Duc de Luynes' prize. We have already informed our readers of the final result of this report, which awards a certain portion of the prize to MM. Poitevin, Pouncey, Garnier and Salmon, and Davanne and Girard. It will, perhaps, be interesting to take an historical glance at the processes presented to the Society, with a view of obtaining the desired end, *i.e.*, the production of unalterable positives.

In September, 1855, M. Jobard, of Dijon, presented a paper on a new manner of rendering proofs indestructible, but his process in which freshly prepared hyposulphite, the use of salts of gold, of bromide of iodine (to produce lights), solutions of iodide and bromide of potassum, are recommended, is not essentially new.

In December, 1855, MM. Rousseau and Mousson recommended the use of bichromate of ammonia mixed with gum and sugar; after exposure, the proof is treated with gallic acid or pyrogallic acid, and is then submitted to the action of certain metallic salts, according to the colour or tone which it is desired to produce. But this process, which consists of twelve or thirteen complicated operations, is very uncertain in its results, and appears to have been abandoned by the authors.

In October, 1856, M. Chambard proposed a sort of gelatine varnish to cover the positives; but this being a purely mechanical means of preservation, could not be admitted to compete for the prize.

In November, 1856, the Society received a communication from M. Homolatsch, of Vienna; the process he proposed was founded on one already made known in 1851, by M. Bayard. The proofs formed on a layer of chloride of silver, are afterwards treated by gallic acid. It appears that M. Homolatsch's process does not fulfil the required conditions.

The fifth competitor is Mr. John Walsh, of London; "the application of his process," says the report, "is limited to positives on glass, and offers nothing new."

In 1857, M. Blanquart Evrard, of Lille, proposed a sort of varnish consisting of gelatine and tannic acid. But this, like the process proposed by M. Chambard, is purely mechanical, and it is required that the competitors should resort to chemical means also.

In March, 1857, M. Jean Schaëffer, of Frankfort-on-the-Maine, describes the use of Fordes and Gelis' salt of gold, stiffening by gelatine, and the application of Schœnée's varnish; but all this was known and practised before by many photographers.

M. Violin, who comes next, proposes that the proofs shall be produced on a layer of salted collodion, previously transferred to paper; but this process, which is not altogether new, did not appear to produce the required permanence of positive proofs.

In July, 1858, M. Gaumé comes forward with a completely new operation. A solution of gutta-percha in benzoin is made. The clear portion of the liquid is poured off—a fine granular residue is left. This is melted and the new paper plunged into it. This preparation of the pure paper gives it a certain impermeability, which seems to prevent the decomposition of the organic matter, and thus it may prove very useful; but the process does not appear to the commission to have any claims on the prize.

Such are the rejected candidates. The rest of the report is dedicated to the discussion of the process imagined by MM. Testud de Beauregard, Poitevin, Pouncey, and Garnier and Salmon; these four candidates for the prize having presented to the Society specimens of a new and important process.

The commission first proceeded to examine the experiments made by M. Beauregard in 1855. The process proved very long, and the result very unsatisfactory, although M. de Beauregard himself was present to superintend the manipulations. MM. Garnier and Salmon's process was next tried: 30 parts of white sugar are dissolved in 30 of water; to this are added $7\frac{1}{2}$ of bichromate of ammonia, bruised in a mortar, and 10 of albumen. The whole, well mixed, is passed through a piece of linen, and applied upon the paper by means of a brush. The sheet is dried by the fire and put into the camera. After a quarter of an hour's exposure the whole proof is covered with ivory-black, and after having been warmed a little at the fire, it is placed carefully in water, the image downwards. "In Pouncy's method," says the report, "the manipulations are rather more simple."

The remainder of this report is devoted to the claims of M. Poitevin as having been the first (in 1855) to give the idea of the carbon process, and to the merits of certain photographic researches by MM. Davanne and Girard. The prize of 2,000 francs, as we stated some weeks ago, has been divided between Messrs. Poitevin, Pouncey, Garnier and Salmon, and Davanne and Girard. The competition for the remainder of the Duc de Luynes' prize is open for three years more.

M. Chambard, whose name we have mentioned above, has lately addressed a short note to the *Academy of Sciences* here, in which he endeavours to prove that the effects observed in M. Nièpce de St. Victor's tubes are to be attributed not to light or to heat, but to electricity. Our readers will already have seen in the "Photographic News" a paper by two young French chemists, MM. Bouilhon and Sauvage, who attribute these effects to a peculiar volatile body which is formed when certain salts or acids act upon organic substances, but of which nothing is known. Baron Paul Thenard attributes these effects to the active condition of oxygen known as ozone. As early as 1856, Dr. Phipson proved that many organic substances, when combining with oxygen, transform the latter into ozone; and he stated expressly that light appeared to facilitate the production of ozone in these circumstances.

On the 22nd of March last, a most violent earthquake shook to their very foundations the chain of the Andes near Chimborazo. The shock lasted five whole minutes, and its effects were felt simultaneously in a great number of towns. At Quito, all the churches, monasteries, palaces, &c. &c., are one mass of ruins. The loss is immense, and the number of victims more than 2,000! M. Boussingault, to whom we owe this sad news, received it from an eye-witness, who, on rushing out of a small chapel situated on an eminence, saw an immense cloud of dust rise into the air. It was the town of Quito which was being shaken to ruins! This fine capital, of 70,000 inhabitants, was almost entirely built of stone, on account of the proximity of the active volcano Pinchincha, which was looked upon as a sort of safety valve, and as rendering earthquakes less formidable—although their phenomena have always been very frequent there. In the more prudent towns of Poupaya and Guyaquill, however, all the edifices are of wood.

The Emperor of the French has ordered a statue to be raised at Versailles to the memory of Alexander von Humboldt.

We extract the following curious experiment from an interesting pamphlet lately published by Professor Nicklès, of Nancy, and containing an account of the last meeting of German naturalists at Carlsruhe. It is well known that iron which is obtained in an extremely fine powder by reducing oxide of iron by hydrogen gas at a high temperature, has so great an affinity for oxygen that, if properly prepared, it takes fire spontaneously in the air and burns with a vivid light. A manufactory has lately been established in the Tyrol to obtain iron powder—principally for medicinal purposes—by mechanical means, *i.e.*, by the aid of very fine files. This iron will not take fire by exposure to air, but it is, nevertheless, very combustible, as M. Magnus has lately shown. If a lighted match be approached to it, it will not take fire; but if the metallic powder be previously attached to the poles of a magnet, and then lighted, it will burn vividly.

To make this experiment, a common magnet is plunged into the iron powder: a certain quantity remains suspended from the poles of the magnet; a light is then applied, when the iron takes fire easily, and all burns away.

M. Nicklès assures us that this peculiar property appears more or less limited to iron prepared in the Tyrol. He has tried the experiment with other species of iron-powder with only partial success. The above experiment caused much sensation at the Carlsruhe meeting.

Photographic Societies.

Blackheath Photographic Society.

The seventeenth ordinary meeting of this Society was held on May 16th, at the Golf Club House, the President, J. Glashier, Esq., F.R.S., in the chair.

The usual business having been transacted, Messrs. Chatteris, C. Busk, and Dr. Kidd, were duly elected members of the Society. The President then proceeded to read a paper on "The application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich,"—a continuation of that read before the Society on the 21st March last. Having described and exhibited diagrams of the apparatus by which a ray of light from a small lamp is concentrated upon the sensitive paper, inclosed in a glass cylinder, kept revolving at an uniform rate by a chronometer, by means of a mirror fixed upon the magnet (which has free horizontal motion) by a stirrup; the nature of the curves registered by the deflection of the magnet, and the mode of calculating their value from a base line, was described,—the lecturer adverting to the so-called "magnetic storms," and showing that they were synchronous at the various parts of the globe where such observations are recorded. He then described the—

CHEMICAL PROCESSES EMPLOYED IN THE PHOTOGRAPHIC OPERATIONS FOR THE SELF-REGISTRATION OF THE VARIATIONS IN POSITION OF MAGNETICAL, AND OF THE VARIATIONS OF READINGS IN METEOROLOGICAL INSTRUMENTS.

First Operation: *Preliminary Preparation of the Paper.*—The chemical solutions used in this process are the following:—

(1) 16 grains of iodide of potassium are dissolved in one ounce of distilled water.
(2) 24 grains of bromide of potassium are dissolved in an ounce of distilled water.
(3) When the crystals are dissolved, the two solutions are mixed together, forming the iodising solution. The mixture will keep any length of time. Immediately before use it is filtered through filtering paper.

A quantity of paper sufficient for the consumption of some little time, is treated in the following manner, sheet after sheet:

The sheet of paper is placed upon a board, covered with oilcloth somewhat smaller on all sides than the paper, a condition necessary for preventing the iodising solution from running under the edges of the paper.

The paper is usually pinned on the left side of the board. A sufficient quantity (about 50 minims for a sheet of paper 15 inches long, and 9½ inches broad) of the iodised solution is applied by pouring it upon the paper in front of a glass rod, which is then moved to and fro, till the whole surface is uniformly wetted by the solution.

The paper thus prepared is allowed to remain in a horizontal position for a few minutes, and is then hung up to dry in the air; when dry, it is placed in a drawer till used.

Second Operation: *Rendering the Paper sensitive to the Action of Light.*—A solution of nitrate of silver is prepared by dissolving 50 grains of crystallised nitrate of silver in an ounce of distilled water, adding in hot weather a few drops of acetic acid.

Then the following operation is performed in a room illuminated by yellow light.

The paper is prepared, as before, upon a board somewhat smaller than itself, and (by means of a glass rod, as before) its surface is wetted with 50 minims of the solution.

It is allowed to remain a short time in a horizontal position, and if any part of the paper still shines from the presence of a part of the solution unabsorbed into its texture, the superfluous fluid is taken off by the application of blotting paper.

The paper, still damp, is immediately placed upon the interior glass cylinder and is covered by the exterior glass cylinder, and is mounted upon the revolving apparatus to receive the slit of light formed by the mirror, which is carried by the magnet.

Third Operation: *Development of the Photographic Trace.*—When the paper is removed from the cylinder, it is placed upon a board, and a saturated solution of gallic acid, to which a few drops of acetic-nitrate of silver are added (in hot weather this solution is used at the temperature of the air, in cold weather it is heated to the temperature of 70° or 80°), is spread over the paper by means of a glass rod, and this action is continued until the trace is fully developed.

When the trace is well developed, the paper is placed in a vessel of water, and repeatedly washed with several successive supplies of water; a brush being passed lightly over both sides of the paper to remove any crystalline deposit.

Fourth Operation: *Fixing the Photographic Trace.*—The photograph is placed in a solution of hyposulphite of soda, made by dissolving four or five ounces of the hyposulphite in a pint of water; it is plunged completely in the liquid, and allowed to remain from one to four hours, until the yellow tint of the iodide is removed. After this the sheet is washed repeatedly with water, and afterwards placed within the folds of linen cloths till nearly dry. Finally it is placed between sheets of blotting paper and a heated iron is passed over it.

CHEMICAL PREPARATIONS AND TREATMENT OF THE PHOTOGRAPHIC PAPERS FOR NEGATIVES.

First Operation: *Preliminary Preparations of the Paper.*—The chemical solution required for this purpose is as follows:—

Two grains of chloride of ammonium are dissolved in one ounce of distilled water.

A sufficient quantity of this solution is placed in a flat porcelain dish, and sheets of paper, one by one, are plunged within it, care being taken that no air bubbles remain between the paper and the solution; this may be prevented by slight pressure over the sheet by means of a bent glass rod. When a few sheets are thus immersed, they are turned over in a mass, and are taken out one by one and hung up to dry.

An equally good result is obtained by spreading over one side, by means of a glass rod, as in the preparation before described, a solution of chloride of ammonia made by dissolving five grains in one ounce of distilled water.

Second Operation: *Rendering the Paper sensitive to the Action of Light.*—The solution required for this purpose is as follows:—To a filtered solution of crystallised nitrate of silver (made by dissolving 50 grains of nitrate of silver in one ounce of distilled water), some strong solution of ammonia is added; the whole becomes at first of a dark brown colour, but when a sufficient quantity of ammonia is added, the solution becomes perfectly clear; a few crystals of nitrate of silver are then added till the solution is a little dull; it is then ready for use.

The following operation is performed in a room illuminated by yellow light:—

By means of a glass rod this solution is spread over the paper, whilst pinned on a board; the paper is dried before a fire, and is then in a fit state to be used for producing a negative.

Third Operation: *Formation of the Photographic Negative.*—A sheet of the paper so prepared is placed upon a bed made of flannel and blotting paper, resting on a sheet of plate glass with its prepared side upwards. The original photograph is then placed on the paper with its own face downwards, and as it is necessary for obtaining a correct copy of the original, that it should be in close contact with the prepared surface; a second sheet of plate glass is placed over it, and the two are pressed together by clamps and screws, or the photograph and sheet of paper are placed in an aiding printing press, and pressed together by its arrangements. The whole is then exposed to the light (the original to be copied being above the paper on which the copy is to be made). The time required to produce a negative depends, in a great measure, upon the thickness of the paper on which the original is made, and on the actinic quality of the light; a period of five minutes in a bright sunshine, or an hour in a clear daylight, is generally sufficient.

Fourth Operation: *Fixing the Photographic Negative.*—When an impression has been thus obtained, it is necessary that the undecomposed salts of silver remaining in the paper be removed.

For this purpose, the negative is at once plunged in water and kept moving, a brush being passed over both sides. It is then immersed in a solution of hyposulphite of soda (made by dissolving two or three ounces of the hyposulphite in a pint of water), and is left through a period varying from half an hour to several hours.

It is then removed and washed in plain water several times, and running water is allowed to pass over it for 24 hours. The sheets are then placed within the folds of drying cloths, till nearly dry, and finally ironed between sheets of blotting paper.

The process of obtaining copies of the originals from the negatives, is in every respect the same as that of obtaining a negative from the original.

At the conclusion of the paper, Mr. Heisch remarked that the proportion of bromide to iodide of potassium used in sensitising the paper, was as nearly as possible 2 atoms of bromide to 1 of iodide.

A vote of thanks was then unanimously tendered to Mr. Glashier for his able and interesting paper; and Messrs. Kent, Crossland, Kieser, and Skaife, having been proposed as candidates for future election, the meeting adjourned.

The following report of the council has been circulated among the members:—

SECOND ANNUAL REPORT OF THE COUNCIL.

The lapse of another year brings round the second anniversary of the Blackheath Photographic Society, and the Council have the pleasure of presenting their second annual report.

The Council heartily congratulate the Society upon its present prosperous condition.

During the past year the Society's numbers have been recruited by the introduction of many of the influential residents in the neighbourhood, several practical photographers—and all zealous to promote the art of photography.

The treasurer's account is annexed, exhibiting a balance of £49 11s. 2d. in favour of the Society.

The *soirée*, which was held at the Mansion House, by the kind permission of the Rt. Hon. the Lord Mayor, on Friday, the 15th April, was eminently successful; and the works of Messrs. Glaisher, Heisch, Melhuish, Knill, Ledger, Smith, Spencer, Wire, and Wood, were such as to elevate the character of the Society from which they emanated. The following gentlemen contributed also materially as exhibitors to the success of the Exhibition, viz.—Messrs. Bedford, Bell, Bunning, Burfield and Rouch, Claudet, Cumming, Delamotte, Fenton, Frith, Horne and Thornthwaite, Jones, Knight, Ladd, London Stereoscopic Company, Murray and Heath, Malone, Negretti and Zambra, Otterwill, Paul Pretsch, Powell and Leland, Pillischer, Rayne, Reeve, Rosling, Ross, Salmon, Shadbolt, Smith and Beck, Thurston, Thompson, Turner, White, Williams, E. G. Wood, and Herbert Watkins; to each of these gentlemen the Council beg to render their warm acknowledgments.

Through the continued kindness of the Golf Club, the meetings of the Society have taken place during the past session at the Golf Club House; the Council therefore offer their best thanks to the officers of the club for affording them a *locus standi.*

The following brief list of papers, read during the session, will show the energy and intellect which have been exercised on behalf of the Society by some of its leading members; and it is pleasing to record the fact that the journals specially devoted to photography, and some of the local newspapers, have given a preference to many of the Society's papers in their publications, and by making them the subject of favourable criticism have demonstrated their original and instructive character. The Council have to acknowledge, with many thanks, the great, nay, the special courtesy shown them by the press generally, and particularly by the editors of the local press, who have not unfrequently, during an unusual pressure of business, given insertions to, and notice of, the transactions of the Society.

The following is a list of papers read during the session:—

"On the Simultaneous Photography of various Coloured Objects." By Mr Heisch.
"A Week with the Camera among the Hills of Kent." By Mr. Wire.
"On Nautical Photography." By Mr. Skaife, showing his "instantaneous method" of taking photographs.
"On two main points in Photography." From Herr Paul Pretch, read by the president; and, from the same source, a paper on Pretch's "Photogalvanographic Process."
"On Metagelatine as a substance for mounting Photographs." By Mr. Heisch.
"On the Dry Collodion Process" By Mr. Heisch.
"On the Application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich." By Mr. Glashier.

The Council regret that so few strictly scientific researches have this year to be reported, as from these only, can fundamental improvement be expected. M. Nièpce de St. Victor continues his experiments upon the so-called storing up of light. Without absolutely ignoring his facts, a careful examination of his experiments, as reported by himself, convinces the Council that they by no means justify the theory he has raised on them. The fact, that the bodies supposed to contain the bottled light exercise their reducing action only through porous substances, such as paper, and have no action through glass or other non-porous substances, however transparent, while the reducing action of light passes most easily through transparent bodies, quite independently of their porosity,—coupled with the admission of M. Nièpce, that heat, vapour of water, and anything which favours the passage of vapours through such substances as paper, materially assist, if indeed they be not essential to, the supposed new action—render it more than doubtful if light have anything to do with the matter. It is also worthy of remark, that none of those accustomed to scientific investigation, who have attempted to repeat his experiment, taking the most moderate precautious against self-deception, have ever succeeded; while Mr. Crookes has shown that at least one of his experiments is quite as successful with substances that have been kept rigorously in the dark. On the whole, the Council see no more reason for ascribing the effect produced by M. Nièpce to light, than they do for attributing anastatic printing to the same agency, because the nitric acid employed in that process penetrates the white parts of the paper, and attacks the zinc plate beneath them, while it does not attack those parts which are covered by the ink. In another direction, however, M. Nièpce's experiments seem to have led to more satisfactory results. He has added to the number of substances which receive an impression from light capable of after-development, and the Uranium Printing Process, founded on these experiments, promises to become of some importance. M. Chevreul, in an appendix to M. Nièpce's last paper, points out the necessity of distinguishing between such substances as are acted on by light alone, and those which are only affected when oxygen is present; and gives a list of those substances on which light acts "in vacuo," of those on which it only acts in the presence of air, or of oxygen, or of those bodies in conjunction with moisture.

The Council must also bring under the notice of the Society, Mr. Pouncey's carbon printing process; for though they can by no means agree with him in his assertion that his prints are quite equal to silver ones, the immense strides he has made, in a comparatively short time, render his process one of great promise. At the same time, the Council cannot but remark, that the conclusion that the prints must be as permanent as those made with printers' ink, because in both carbon is the colouring matter employed, has been much too hastily arrived at, as it has yet to be proved that the glue and bichromate of potash employed as a vehicle, is as unalterable as the oil, resin, &c., which enter into the composition of printers' ink.

The discovery of Mr. J. H. Young, that the invisible image on a collodio-albumen plate can be developed, after the removal of the iodide of silver, by hyposulphate of soda or cyanide of potassium, is too important to be passed over without notice, showing, as it does, that the change produced in the iodide of silver by light is even greater than has hitherto been thought. At present it does not appear that he has produced any but transparent positives, printed from negatives by superposition; so it remains to be seen if the comparatively feeble light of the camera is capable of producing the same effect.

The Council would take the opportunity of reminding members, of the forms for the registration of observations with which they were last year furnished, none which appear, up to the present time, to have been filled up. They would press upon members the necessity for a little exertion on this point, as it is only by a comparison of a number of observations, made in different places and under various circumstances, that any good results can be hoped for. With a view to facilitate these observations, Mr. Heisch has prepared shorter forms, embodying only the most important points, and those which can most easily be attended to in the field.

The new forms of lenses are still exciting much discussion. The members have had some opportunity of judging of the results obtained with them at the late exhibition at Suffolk Street. The pictures by Mr. Bedford were mostly taken with a Grubb lens, those by the late Mr. Howlett, with a Ross Petzval.

The Society, since the publication of the last report, have to regret the loss of several members, from various causes, chiefly through removal from the neighbourhood, among whom should be specially noticed the name of G. Busk, Esq., F.R.S. The Council record the secession of such with regret. While acknowledging with thankfulness the labours of those members who, in the midst of important avocations, have kindly devoted their time to the production of papers for the intellectual gratification of the Society, the Council have to urge upon other members the necessity of contributing somewhat to its intellectual maintenance, recording their opinion that a failure in this particular presses somewhat unfairly upon those gentlemen who have already exerted themselves so much in that direction. In conclusion, the Council point with satisfaction to the position the Society has obtained in the public estimation, and venture to add that such combinations cannot fail to exert a beneficial influence upon the community at large, fostering, as they do, two important principles, viz., the extension of scientific information and original research, and the bringing together, for that result, those who are desirous of cultivating knowledge.

THE FRENCH PHOTOGRAPHIC SOCIETY.

THE chair was taken at the last meeting of the above Society by M. Regnault, the President.

After the names of the newly-elected members were read—

M. Signoret presented to the Society, in the name of M. Nachet, an apparatus for the production of small microscopic photographs.

In reply to an observation made by a member concerning the chemical focus, M. Signoret stated, that M. Nachet had not been able absolutely to eliminate it in these instruments, but that, by a few trials, the operator could easily determine its place.

MM. Davanne and Joüet read a note on a process for obtaining pure silvery whites on collodion positives. (See p. 135.)

M. Paul Perier read, in the name of the commission, the following report on the competition for the prize of 2,000 francs, offered by M. le Duc d'Albert de Luynes:—

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.

GENTLEMEN,—The commission constituted by you on the 16th July, 1858, for the purpose of examining the processes and proofs sent to compete for the second of the two prizes founded by the Duke de Luynes, has terminated its labours. It now renders you an account of them, and informs you of the decisions at which it has arrived, by virtue of the powers founded on the programme read at your meeting of the 18th July, 1856.

Before laying the progress and details of our labours before you, and announcing the names of the successful candidates, it is necessary to pause before a preliminary consideration of the highest importance; for it is impossible not to foresee—and hence it would be imprudent not to guard against—the abuse that some will not fail to make of what we might have the want of tact not to say, as they possibly will do of what we shall have the frankness to avow. Can we forget, in fact, that at the very moment when we occupied ourselves in considering the means of assuring to our proofs the character of permanency, a large portion of the public, hostile, indifferent, or badly informed, predicted a prompt and fatal destruction of our pictures? If, then, in following the line traced by the Duke de Luynes—in studying the conditions of permanency for the purpose of fulfilling them—we leave in obscurity the questions of possible duration, relative and probable, in the present state of the art, do we not create a risk of misunderstanding by some, and of malicious disparagement by others? Will not the conclusion be drawn, that the seeking of a method of assuring the permanency of future prints implies the confession, that those now in existence will inevitably fade away?

That is why, gentlemen, we desire to balance the evil we are bound to admit by the good we are enabled to affirm; and, neither making ourselves greater or less than we are, nor to exhibit any inward weakness, nor furnish a dishonourable weapon to the enemies of the art and the interests defended by our Society.

Now, when we consider the programme which actuates, explains, and determines the competition, we find therein nothing more or less than this:—

The establishment of the fact of the accidental alteration of a certain number of proofs.

Admission in theory, under certain conditions, of the possibility of alteration in all proofs whatever.

The great utility of researches tending to render every image, if not unalterable, at least as indelible as the products of printing, engraving, and lithography have been hitherto.

But the confession that our proofs, when properly treated, must necessarily and promptly fade, will nowhere be found. Let us repeat the textual expressions of this programme, as given by our President—a high authority in such a matter:—

" . . . . Before all things we should be assured of the indefinite preservation of the proofs. . . . Unfortunately, many proofs which have only been in existence a few years are, at the present moment, seriously altered—some, even, have completely disappeared. . . . Photographers have spared no pains in seeking for the causes of this rapid change. . . .

Photographic Societies have recorded for years past a large number of fixing processes, which their originators have presented as assuring the indefinite preservation of proofs. . . . They have been able to verify important improvements. . . . There is room to hope shortly for greater still. . . . But the indefinite preservation of proofs can only be ascertained by the experience of several generations. . . . The knowledge of the chemical and physical properties of bodies suggests objections, of which time alone can prove the exactness." (Here follows the theory of the eventual alterations, physical and chemical).

"Carbon is, of all substances that chemistry has brought to our knowledge, the most stable and unalterable. It is therefore evident, that if we could succeed in producing the blacks of the photographic design by carbon, we should have the same guarantee for the permanency of our proofs as for the permanency of our printed books, and that is the most we can either hope or desire."

Thus, gentlemen, you have understood it. Numerous instances of fading, or total disappearance, have been pointed out with regret; we acknowledge too the recent completion of good proofs that have remained perfectly intact; modest, and full of reserve, in the face of such recent traditions, we admit doubts, we pass in review possible accidents, we are loyally frank in multiplying them: but if we do as the man who exaggerates his defects and glosses over his good qualities, we do not go so far as to avow ourselves radically vicious; and no more than we arrogate to ourselves the right of affirming perpetual durability, do we allow any other person to affirm their undoubted destruction. Let us dare to add, now, that this modesty, that this laudable reserve, have, perhaps, been carried to excess, and that it is time to bring them back within juster limits.

That which the programme has not said—that which, it is true, it was not in a position to say three years ago—it is now our right and duty to declare. In the first place, the proofs that have faded partly or entirely out from the discovery of our art until the present day, have been for the most part badly treated, fixed, toned, or washed with negligence—infected, in a word, by the operator himself, at some point of their production; or, in hands otherwise careful, they have been produced, either by following methods which science had already pronounced to be wrong, or by others current at the time through the ignorance of rational and sound processes.

In the second place, conscientious and intelligent photographers can show a certain number of proofs embracing all the dates that have elapsed since the discovery of photography, which present such brilliancy, force, intensity, and delicacy of tone as to warrant the inference that they are entirely unchanged from their original condition.

These are isolated facts, it will be said—exceptional cases. Granted that they are so, still they are conclusive, and are sufficient to condemn the violence of our detractors.

If, now, from these isolated facts we desire to form a theory of complete security, we should, to a certain extent, be authorised therein by recent and valuable researches which have arisen to confirm hopes, previously supported on bases of empiricism alone.

This is the place to recall a new detail which corroborates our reservations. The programme of 1856 was so far from making cheap work of acquired processes, it so little abandoned their cause, that, placing itself, on the contrary, in the hypothesis of the maintenance of their continued—not to say exclusive—use, it proposed, as one of the conditions of the second of the prizes founded by the Duke de Luynes, a complete study of the different chemical and physical actions which intervene in the processes employed, or which influence the alteration of the proof. This was saying implicitly that the insufficiency of these processes was in no way demonstrated; that the imperfections of many of the results obtained, that the doubts avowed respecting the permanency of others, depended less on the scientific methods or their true theory, than on the obscurity which might still envelop them, and cover the rocks with its shadow.

To this appeal of the programme, gentlemen, you are already aware of the answer that has been given.

By throwing a new or more vivid light on so many of the causes of alteration, our colleagues have demonstrated, up to the extreme degree of probability which verges on certainty, that all of those causes which remain hidden must belong to one of the established categories; and in furnishing this sketch of the wrong paths followed by the first explorers they have prepared, at all events very approximately, the official map which will soon conduct us to our object by the shortest and most certain road.

The more general use during the past three years of sel d'or for toning, the excellent modifications that have been made in this process, sanctioned by the beautiful results that have ensued, powerfully concur in authorising this measure of confidence we entertain, and which we desire to communicate to others. There are few proofs now-a-days in the formation of which salts of gold do not intervene, with such variations in the formula as support the common principle; and until the day arrives when carbon-printing shall have shaken itself free of its youthful bonds, we are of opinion that it is necessary to attach ourselves more and more to auriferous baths, in which are found the best conditions of permanency.

We must once more recall to mind that the first guarantee of permanency is to be found in making it a rule to observe the most minute precautions, and using the most vigilant care, in the whole series of manipulations. Let us respect this rule; let us abstain—a thing easy enough in future—from formulæ and substances, from operations which photographic science has pointed out as being dangerous, and we may, we and our works, brave the menaces of time.

Scrupulous care and precautions are the points on which photographers generally have been hitherto wanting; and from this cause have arisen the complaints of the public. It will not be without interest to pause here a moment, to show these imperfections are not inherent in the process, but are due to individual carelessness. The question is worth a little trouble, for the evil is as real in fact as its explanation in principle is easy and re-assuring.

If photography were nothing more than a pastime for idle people, or even if it were an art confined to a small number of products of a great price; if the rapidity of its progress had not in a short time made it the support of one of the most extending trades, and the source of large commercial undertakings, we could less easily understand that the works created by it had not always been under the best conditions. But what, on the contrary, is the source of the greater part of the photographs which the public see out of doors or in porfolios of collectors? It is most certainly the workshop of a photographer who, although an artist, is at the same time the head of a trading establishment, and upon whom the conditions of every trade to produce largely acts with greater force, because therein lies the *sine quâ non* of cheapness necessitated by competition.

Now, we believe we shall not hurt the feelings of any person, and we know how to make honourable exceptions, in saying that, in its early years especially, in the era of doubts and searches, either from error or carelessness, an enormous number of negligently prepared and defective proofs were sent out from these *ateliers*. It would answer no purpose to be silent on this point, since it is a fact averred and known by everybody. On the contrary, it is of the highest importance to remind all our *confrères*, that in this lies the real danger, and that it depends on them to lose the public confidence on which they depend, without a hope of getting it back again, or to regain it and keep it by applying the remedy which in this case is to be found beside the evil. Doubtless, it is not to be expected that the head of a photographic *atelier* can personally watch over the printing of each picture. He cannot, like the amateur, who calculates neither his time nor his outlay, paternally caress all his proofs one after the other. It is easily understood, therefore, that at the epoch when processes were not well devised, and when success required a series of minute and prolonged corrections, that the eye of the master being absent, the house suffered. But the difficulties, which each day tends to diminish, being now almost entirely vanquished, let us hope that hereafter they will listen more willingly to the voice of honour and interest, within as well as beyond our frontiers—for the plague from which we still suffer was infinitely more serious abroad. In celebrated cities and countries where the tourist is continually wandering, the reckless photographer, whose conduct deserves the strongest reprobation, delivered the traveller proofs, treated *en masse*, in such haste and under such conditions, that they could not have a longer life than the roses of the poet. On reaching the end of his wanderings, and once more by his own fireside, the enthusiastic amateur had nothing for it, when he opened his portfolio, but to resign himself to the conviction that he had been victimised—

> "Swearing, though a little too late,
> They should not take him in again."

This, in fact, is the oath they must often make; and photography has not more reason to fear for her renown than her interest. The best means, nevertheless, of repairing the evil after having pointed it out, is not to allow of its being exaggerated, its causes distorted, nor to grant those who criticise us that which we ought to refuse them. The most exalted art cannot guarantee all artists against failure; neither can we flatter ourselves that in ours all those whose duty it is to do so, will consult the common advantage. It is probable that there will always be ephemeral and deceiving photographers; is that a reason for condemning permanent proofs? And is it not sufficient that the enlightened amateur can always find an able producer, and the prudent purchaser a conscientious vendor? There are detestable engravings, which it would be far better to see effaced instantaneously, than that they should exist permanently. Painting itself, and sculpture, count a hundred mediocrities for one *chef d'œuvre;* yet we admire these arts, without any thought of their unwholesome fecundity. Photography, in its humble sphere, will defend itself by its merits. She will rise from this redoubtable struggle, and triumph over those who refuse to believe in her attaining a green old age, as well as over those who would place her on a level with a mechanical automaton.

This long preamble is forced on us by the importance of the subject.

Ought we to fear that persons may deceive themselves as to the bearing of our words, and profess to find in them a contradiction with the very object of the report? We think not. One thing required is, the use of a new process which wants the consecration of time, even though we may have every reason to believe it excellent; another thing is the use of methods which authorise and confirm, by raising them above all doubts, a well founded confidence in the proof of centuries.

It is clear that convictions, and even the most plausible theories, have little weight beside the argument which calls itself *four* or *five hundred years.* Thus the chloride of silver, the chloride of gold, and their most complete reductions, are to printing ink that which the 19th century is to the 16th; even though one may seem to have the right of saying—*it is certain that I shall live,* the advantage will always be with that which can reply—*it is certain that I have lived.*

We will now commence by stating succinctly the system we adopted since our first meeting, for the purpose of making a definitive selection among the candidates.

Wishing to simplify the labour and to clear the ground at once, we resolved in the first place to eliminate the previously known processes, those which had no real bearing on, or direct connection with, the object proposed by the founder, and we reserved for a sub-committee, chosen from among ourselves, the care of submitting to complete and comparative experiments those which remained after this first degree of election.

In September of 1855, M. Jobard, of Dijon, caused a note to be presented to you relative to the fixing of positive proofs, which he conceived he had treated in a novel manner, and which he thought he had by that means rendered indestructible.

But the cause of alteration pointed out by him as unique having already been brought to light by MM. Davanne and Girard, the use of new hyposulphite, the colouring by the salts of gold, and even the use of bromine and iodine for cleaning when necessary, not belonging to M. Jobard, there remained nothing new in his process except the aqueous solution of iodide and bromide of potassium, as the first colouring agent, which could not constitute a serious title to the prize, however satisfactory in appearance and reality M. Jobard's proofs have remained hitherto.

On the 21st December, 1855, a process by MM. Rousseau and Masson was communicated to you, the applications of which are several. The first part, which concerns the printing on paper alone, enters into the category we have to consider this year. It is the first of those which will occupy us in this report, the principle of which was the use of bichromate of ammonia, mingled with an organic body—gum, and a saccharine matter. After exposure in the printing frame under a negative, and the washings, gallic and pyrogallic acids intervened; the final result was obtained by the successive action of different metallic salts, varied according to the tone or colour it was desired to produce; these tones or colours are declared by the author unalterable, as being formed by films of gallates or prussiates with metallic bases. We had no specimens; MM. Rousseau and Masson not having persevered in the application of their discovery after the presentation made by them. As to the practical hopes to be founded on its actual condition, it is sufficient for us to say, to justify our doubts, that the process requires no less than twelve operations in the most favourable case, and often fifteen, three or four of which have to be performed in the dark, some of them being besides, according to the author's own showing, delicate, and subject to frequent failures.

At the October meeting of 1856, M. Chambard presented a dead brilliant varnish for positive prints. This appeared to be nothing more, at least so far as the brilliant varnish was concerned, than an application of gelatine by means already well-known in the cardboard-box trade. He gave no formulæ. He also proposed a positive process on translucid sheets, which would realise, as he said, great advantages. It was quite certain that this method of preservation was purely mechanical and physical, independent of the production and chemical constitution of the proof; there was nothing for it but to exclude him from the list of competitors.

[The report extends to such a length that we must defer the continuation until next week.]

The above report was then approved and adopted by the Society, and ordered to be inserted in their *Bulletin.*

M. Bertsch then read a note, which was addressed to the Society by M. Berchtold, relative to a process of engraving photographic proofs (see p. 133), and exhibited several proofs taken in this way.

M. Davanne presented, in the name of M. Koch, ebenist, a new portable dark box for travelling, in which the maker had endeavoured to unite the latest improvements. The description of this apparatus would be unintelligible without a diagram. The thanks of the Society having been given to the above gentlemen for their communications, the meeting terminated.—*Condensed from the Bulletin of the French Photographic Society.*

Photographic Notes and Queries.

DRY PROCESSES.

Sir,—As the question of the comparative merits of the dry processess is being now agitated, if you think my experience of any worth, I will state it shortly.

In the first place, I must tell you that with almost *every branch* of *every process* I have had success; my results you know, and also some of my experience, and the fact of my having much time at my disposal, accounts for my making such an assertion as that of having worked almost, if not quite, every process.

Mr. John Draffin's experience has been very like my own. Taupenot's process, I have no hesitation whatever in saying, requires the least care, and is subject to the least risk in preparation of any of the dry processes. In my hands it has proved the most successful. I have just returned from an excursion, where I exposed 27 plates—18 stereoscopic and 9 large —and in these there is not a single failure, and never have I produced better pictures, although the objects might be considered difficult. I am totally at a loss to make out how operators contrive to get blisters—the great drawback to this process, if common opinion is to be taken. I believe that these will not be met with if the plates are dry before coating with collodion, and also when exciting the albumen surface to fit them for the camera.

In the "Photographic News," May 13, I see that Mr. Mudd makes mention of purposing to make a box to keep collodio-albumen plates for a longer time ready for the camera. Surely no such thing is required; as I have before stated, plates in a tin box will keep good for weeks. I have used them often 5 or 6 months' old, and got good pictures *as* *a rule*, with those kept this time. In short, with this process and common care, a man need never fail except by an accident, unavoidable in every process, or, indeed, in any common act of life.

Fothergill's process gives beautiful results, but there is an uncertainty about it which, with the very best manipulation, often shows itself. For instance, a friend of mine, after working collodio-albumen for some time, changed to this, and produced good pictures often, but seldom without *some* failures. A short time since, however, he visited a fine neighbourhood, and brought back a good quantity of exposed plates. He developed, and without a single failure, got a *beautiful* series of pictures. Of course, he declared that no process could be compared with Fothergill's, and he should work no other. In a few days he went on another excursion, and exposed a lot of plates prepared in the same way, and with the same chemicals; with these, to his intense disappointment, he scarcely got one picture fit to be printed. So it is that all my friends' experience speaks with *certainty* that the collodio-albumen far exceeds Fothergill's, because we must consider (as Mr. Draffin says) that process *best* which will work *every* kind of subject most perfectly. One advantage Fothergill's process possesses, the light passes through more perfectly, and so the positives are printed rather more quickly; this seems to me the only thing in which it is at all superior to the collodio-albumen. As to the results, was not the prize stereoscopic picture at Nottingham by the latter process? As to the ease of preparation, is not that the least liable to mistake where a man cannot wash too much? And in these good negatives by Fothergill's process which I have seen, the picture is seldom perfect to the very edge, as it is generally in the other.

I have no desire to depreciate Mr. Fothergill's modification, but it has been raised so high at the cost of the other dry processes, that the followers of the other methods have thought it only just to rescue them from what may almost be termed *slander*. O

SULPHATE OF IRON DEVELOPER FOR THE FOTHERGILL PROCESS.

SIR,—As I have obtained several valuable hints through the medium of the "PHOTOGRAPHIC NEWS," I think it only due to your correspondents who have given the photographic world so much information, to communicate to them through you what appears to me to be a discovery and a valuable one, albeit exceedingly simple and obvious, viz., that the protosulphate of iron developer, which has latterly come into such general use, and with such beneficial results in the production of negatives by the wet collodion process, may be used with equal success in Fothergill's process.

I have found that negatives obtained by Fothergill's process developed with pyrogallic acid are invariably inferior to wet collodion negatives in softness and half-tone; but when developed with protosulphate of iron, if the exposure has been rightly timed, the negative is almost (if not quite) equal to one obtained by the wet collodion process.

The development of the picture is also much more rapid when iron is used, and I believe that the time required for exposure is shortened in the same proportion as it is when wet collodion is employed, and developed with iron instead of pyrogallic acid.

It will hardly be necessary for me to add that a few drops of nitrate of silver must be added to the iron, in the same way as it would be added to the pyrogallic acid, if it were used; but I have never found it necessary to intensify with pyrogallic acid and silver afterwards, as is generally necessary in developing a wet collodion picture with protosulphate of iron.

I inclose a print from a negative taken a few days since on a Fothergill plate prepared about six weeks previously, and developed with iron; it had 3½ minutes exposure, calloscopic lens, 15-inch focus, covering a plate 11 × 9 inches, the object, the door of a church, being well lit and near the camera.

The proof is rather over printed, and you will observe that the camera was not perfectly level when the view was taken; but it is the only print I have at hand, and it will serve to show that the iron developer is really applicable to the Fothergill process. H. S.

THE EMPLOYMENT OF SILICIC ETHER IN PHOTOGRAPHY.

SIR,—The following is the mode of preparation of the silicic ether, which you were so kind as to solicit in your last number.

The preparation is simple enough to any one having a knowledge of chemistry, but the expense is considerable. Alcohol containing 16 per cent. of water is gradually poured on to some chloride of silicium, a great quantity of hydrochloric acid is first disengaged, and the mixture must be put into a tubulated retort carrying a thermometer. On heating to between 160° Cent. to 300°, a mixture of aqueous alcohol and chloride of silicium first passes over, but when the thermometer marks 350° the receiver must be changed and the distillation continued on the naked fire. The liquid distills in a few minutes, and is the sesquibasic ether—$3\ C_4H_5O.\ 2\ SiO_3$.

A small quantity of aqueous alcohol must be added to this ether, and the mixture re-distilled. When the volatile products cease to come over, the contents of the retort thicken, and the operation is then terminated. On cooling, the mass solidifies; this is *the* silicic ether—$3\ C_4H_5O.\ 4\ SiO_3$. Wood spirit also furnishes these ethers.

As I have before said, its expense would be the greatest drawback to its use; but if it becomes a commercial article, I dare say it could be manufactured sufficiently cheap, just as was the case with aluminium, which used to cost as many pounds per ounce as it now costs pence.

H. C. JENNINGS, JUN.

DRY PROCESSES.

SIR,—In a paper by Mr. Draffin, read before the Chorlton Society, it is stated the collodio-albumen process is more rapid in its action than that of Mr. Fothergill.

My own experience leads me to the opposite conclusion, and the following experiment which I made when the idea was first started, proves it satisfactorily to my mind.

Having failed in my first attempts, from the too contractile character of new collodion, which split off on drying, I tried a sample which had been iodised for a year, and had become short or rotten; this I found answered for both purposes; it did not split with the Fothergill, nor blister with the collodio-albumen.

I prepared plates with both systems, same collodion; I exposed both at the same time with the same lens; one made for me by Millet, of Paris, a double combination 4-inch focus, with very small stop between the lenses; the result was, that I got an excellent picture in one minute by Fothergill, and an equal one in *three* minutes by the collodio-albumen.

I have lately tried the comparative experiments again with collodion made fresh by Mr. Keene, but although the time of exposure required was much shorter, I always find Fothergill's *three* times as quick; and if sal ammoniac be added to the albumen in the proportion of two grains to the ounce, the exposure will be reduced half.

Now, in these trials I was very careful not to wash the plates after sensitising more than was just sufficient to remove the greasiness, as I am aware that profuse washing before the albumen is applied, reduces the sensitiveness of the film, and hence no doubt arises the cause of such different results with different manipulators. It is only by comparing notes that we can arrive at truth, and it is with this view that I trouble you with the notes of AN AMATEUR.

P.S.—Mr. Draffin dries his plates in an oven; how are they protected from light during the operation? I tried a tin box, but the steam condensed on the plates and stained them.

ANSWERS TO MINOR QUERIES.

Recovery of Silver from Solutions.—*A Puzzled Amateur.* As your solution does not contain anything but nitrate of silver and the ordinary impurities which will unavoidably find their way into a nitrate bath after it has been in constant use for a year or so, you need not go through the whole of the process for the reduction of residues which we gave in our first volume, but may simplify the process very much in the following way:—Add excess of salt to the bath, allow the precipitate to settle, and pour off the clear liquid; put into the thick pasty mass of chloride of silver, cyanide of potassium, in coarse powder, until the chloride has dissolved; then add lumps of common washing soda, to about the same amount as the cyanide employed, and evaporate the whole down to perfect dryness. When dry, powder and project it in small quantities at a time into a red hot crucible; expose to a full red heat for ten minutes, and a button of pure silver will be found at the bottom of the crucible when cold.

Proto-iodide of Iron.—*Iodide*, and some other correspondents, have asked for the particulars of the preparation of proto-iodide for adding to plain collodion, as recommended by Mr. Seeley (vol. i. p. 280). Add 40 grains of pure proto-sulphate of iron, in fine powder, and thoroughly mix it up in a mortar with 24 grains of iodide of potassium, adding a drachm or two of alcohol, and grinding well together for five minutes; then add alcohol to make up the bulk of liquid to two ounces, and place in a clean, well-stoppered bottle. A few inches in length of clean iron wire (pianoforte wire is the best) should be beat up and put into the liquid, in order to keep the proto-iodide of iron from becoming per-iodide. There will be a deposit at the bottom of the bottle, consisting of sulphate of potassa; this may either be filtered off or may be disregarded, provided the clear solution only be decanted for use. When it is required to iodise a little plain collodion for rapid work, 1 part of this alcoholic solution of proto-iodide is to be added to 3 parts of good plain collodion; but only a small quantity should be made at a time, as the iodised collodion will not keep many hours.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Phosphorescence.—Some papers by Mr. Pearsall, on the effect of electricity upon minerals which are phosphorescent by heat, are to be found in the first volume of the *Journal of the Royal Institution*, pp. 77 and 267.

W. Child.—Received. Shall be inserted.

E. L. A.—1. The photographic part of your stereogram is not bad; but it is spoilt in the mounting—the right hand picture should be on the left side, and *vice versa.* 2. If you develop with gallic acid, you must not expect rapid development, as it will frequently occupy more than an hour. 3. You would be likely to obtain better results by using a pair of No. 1 lenses. Your ¼-plate portrait lens will not do so well for landscape photography as a 6-inch focus stereoscopic lens.

No Chemist.—In the first place our correspondent should endeavour, as soon as possible, to qualify himself for the signature "Chemist," instead of his present one, by studying our "Lessons on Chemistry" in vol i. Try what effect the addition of one grain of acetate of soda to the ounce of nitrate bath will have; that will be likely to increase the intensity of your pictures. Try the positive printing process, as given by our correspondent ◊ in one of the early numbers of our second volume.

Iota.—We will make inquiries, and answer your question as soon as we can ascertain particulars.

J. B. N.—1. A mixture of equal parts of alcohol and ether, both pure, is the best for diluting collodion with. 2. They would be worth exhibiting, although they would not be likely to be the best of the sort in the exhibitions. 3. We have no control over the use which advertisers make of our published opinions of any article submitted to us for review. We do not object to an extract being made, if it is done honestly, and so as to represent our opinion fairly.

T. A.—Our correspondent's theory is ingenious; but we should wish to see some experimental evidence of its probability.

Delta.—By writing direct to the optician named you will obtain all particulars. Use the aplanatic lens.

Beginner.—1. The nitrate of silver bath used for sensitising positive albumenised paper always turns of a dark colour after being used for some time. Several methods of decolorising it are given in our former numbers. Of these we think the plan of precipitating a small quantity of chloride of silver from the bath, by adding a few grains of common salt, is the best. The chloride, in going down, carries with it the colouring matter, and the solution, after filtration, will be clear and fit for use. 2. The fogginess you complain of is attributable to your using a portrait combination instead of a view lens. With one of the latter, you will not meet with this defect.

J. C. L.—The process is not sufficiently worked out to enable very exact formulæ to be given. The chemicals named may be procured at any good operative chemists. The paper should not be albumenised. Our correspondent would be obliging many of our readers, as well as ourselves, were he to experiment a little upon this process, and forward to us the result of his labours when he has succeeded in discovering the most successful method of working.

A Subscriber from the First.—See second answer to "Beginner" above.

J. T. T.—Received.

Unfortunate.—Practice and experience is all that our correspondent wants, and all his difficulties will be found to vanish. The streaks on the plates may arise either from the bath not having an acid reaction, or from the plate not being allowed to remain in it long enough. The small chip out of one side of your lens will cause no other inconvenience except a slight diminution of rapidity, if you fasten a small piece of black opaque paper over it.

F. M. Y.—Fused nitrate of silver is generally preferred, but if it be not procured from a very good maker it will frequently produce inferior results to a bath made with the ordinary crystallised nitrate. Use from 30 to 35 grains to the ounce.

J. H. U.—We have forwarded our correspondent's queries to the author of the articles, and will insert the required information in our next number if possible.

Y. G. W.—Add some precipitated chalk to your hypo. bath; it will form a milky liquid, and will neutralise any acid which may be formed.

Bath.—Your gun-cotton is very bad; for the present buy it ready made, as with your slight knowledge of chemistry you cannot hope to make it equal to that which is made by experienced chemists, and properly tested. Your sample is quite insoluble in the usual solvents.

H. A. W.—You will find the calotype, or the waxed paper process, suitable for your purpose in preference to wet collodion.

B. L.—We cannot judge without seeing specimens.

P. N. C.—A portion of the hypo. bath has touched the positive paper when there was free nitrate of silver on the surface. You cannot now remedy the stain, but you must be more careful in future.

A. Pyro.—(Does not our correspondent mean A Tyro?)—The blue tint is produced by the action of the iodine in the iodising solution upon the starch in the paper; it is no detriment to the process; on the contrary, many photographers prefer their iodised sheets of paper to be of this colour, and for this purpose free iodine is added to the iodising bath.

Kalos.—You cannot expect half a dozen grains of gold will colour an unlimited number of pictures. It has lasted longer than we should have expected, and we really think that the bath now deserves "refreshing" with a few more grains.

S. R.—If you really are what you say, "a subscriber from the first," you have subscribed to very little purpose, as the whole of your questions have been most fully and completely answered in our first volume; and had you consulted the index you could never have asked us such very trivial questions.

An Amateur.—Your letter has been forwarded.

M. H. Y.—Imperfect washing is usually considered to be the cause of fading; but according to Maxwell Lyte, the presence of chlorides in the washing water is very deleterious. On this account you will find washing the prints in distilled water of great advantage, especially as you say that you can get unlimited quantities of distilled water for nothing.

A Beginner.—For the present an ordinary spectacle lens of about 12 inches focus, and stopped down to half an inch aperture, will be as good a lens as you require; it will take better pictures than you imagine, and is as good to practice with as the most expensive achromatic combination.

S. T. T. O.—You should not have the tin box blackened, either inside or outside. Inside it is useless, as the box ought to be perfectly dark without the assistance of paint, and outside it will be injurious as tending to absorb heat and make the interior temperature too high.

T. Clark.—The letter did not arrive. We shall be glad to see the copy referred to.

Captain S. S. B.—1. No satisfactory process has yet been discovered by which a varnished negative may be transferred to waxed paper or gelatine. An unvarnished collodion picture may be transferred to gelatine by soaking the latter in water for a minute or so, until it has become thoroughly soft, and then introducing the wet picture on the glass into the dish of water, sliding it under the gelatine and lifting them both up together, and then resting up to drain. When quite dry, the gelatine will easily detach itself from the glass, and bring the collodion film with it. No varnishing is required. If the above plan be adopted for fixing a sheet of gelatine on a glass plate, and it be then dried, we should think that it would do well for taking collodion pictures on—though, as we have never tried it, we cannot speak for certain. 2. The best thing you can use in the plate drying box, is dry chloride of calcium; but care must be taken that it is placed so that it can do no harm, as it is very deliquescent and becomes liquid very readily in the presence of water. 3. Sulphide of ammonium is a good thing for precipitating gold from an alkaline toning bath, but not better than solution of liver of sulphur. 4. You can strain your precipitate through a piece of unbleached calico nailed on to a frame. We shall be glad to receive a description of the apparatus mentioned. Some points in your letter appearing of general interest, we shall avail ourselves of your permission to publish it.

Zingib.—No toning process is given at vol. i. p. 68; so we cannot tell anything about a print said to be toned in the manner there described.

C. Subscriber.—1. The enamel process is, we believe, patented; for the particulars we must refer you to the advertisement. 2. It will do very well.

Doubtful.—You have omitted mention of the aplanatic, which we think would suit your purpose best.

W. L.—1. We hardly think the caution is worth inserting. No photographer would expect to take a good picture if his tent were pitched close to a very offensive ditch. 2. Distilled water should be used for all the washings. 3. It may be filtered through paper. 4. We do not think it is to be washed after the application of the mucilage.

Photos.—Bromide of cadmium was intended. You must try the effect for yourself; we cannot enter into such very minute details, as to the exact effect produced; they would vary with every collodion.

Communications declined, with thanks:—W. G. (artist).—An Old Hand.—A Hater of Servile Copying. (We have neither space nor inclination to enter into controversy with any of our contemporaries.)—F. L. A.—U.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Ignoramus.—J. S. T.—An Artist.—P. O. S.—A. Hall.—R. A. C.—R. O.—An Amateur (Belfast).—C. M. A.—L. W. P.—F. A.—Distance.—M. H. B.—Albumen.—Philo. Pho.—G. M. T.—M. L.—Scientia.—R. R. R. R.

In Type:—John Sang.—Viator.—A Kerry Man.—T. Barrett—J. W. W.—W. L. C.—S. S. B.—Henry Doubleday.—B. A. I.—Philoxymel.—Inquirer.—J. B.—N. T. A.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 39.—*June* 3, 1859.

THERMOGRAPHY. — CALORIFIC RADIATIONS CONSIDERED AS A MEANS OF PRODUCING IMAGES ON SENSITIVE PAPER.*

BY M. NIÈPCE DE ST. VICTOR.

The experiments which I am about to describe are an extension of those of Moser, Knorr, and Draper. I believe I have added to those facts which are already known, a large number of new and interesting facts of such a nature as to throw some light on this class of phenomenon. If, on a plate of metal heated by contact with boiling water, there be placed first an engraving, or a sheet having characters printed on it in printing ink, and over that a sheet of paper prepared first with nitrate of silver and then with chloride of gold, a violet blue impression is obtained of the *dark* parts of the engraving, or printed letters. If the paper be only prepared with nitrate of silver, the *light* parts of the engraving will be reproduced of a lustre colour. A metallic tube, heated to a temperature of at least 212° Fahr., and having the orifice covered with the engraving and sensitive paper, produces the same result as the contact with the heated surface.

With the paper prepared with the salts of both silver and gold, and using the plate heated to the boiling point of water, the large letters of the print are copied at a distance of several millimetres; but the effect does not take place if there be interposed a continuous film of mica, metal, or even of rice paper, however thin it be.

If we place between two pieces of glass a sheet of paper having letters printed on it in printing ink, and if we heat the whole to a temperature sufficient to slightly char the paper, it will be seen, after having removed the printed characters, that they have left an impression; and if on this image there be placed a sheet of paper prepared both with nitrate of silver and chloride of gold, and the whole be heated by contact with the plate heated with boiling water, a second image is obtained, the same as if the sensitive paper had been placed directly on the printed letters.

Designs formed with ordinary ink, with plumbago, or wood charcoal, are not reproduced if made on ordinary paper, but if on rice paper they are copied.

A photographic positive on collodion, not varnished, consisting of reduced iodide of silver, has yielded several consecutive impressions of the dark parts on sensitive paper under the influence of heat. The last proofs are even the sharpest and strongest.

Plates of glazed porcelain, having on them dark letters or paintings in different colours, drawn by hand and burnt in, have given me impressions when they were not coated with enamel; but they are not reproduced if the designs are so coated.

Coins and cameos are very well copied even at the distance of a millimetre, and in spite of the interposition of a continuous thin film of mica, silver, or copper, provided that the impression be bold enough and the temperature sufficiently high.

If a piece of paper, on which is traced a design in lampblack, or even in wood charcoal, is heated to a temperature sufficiently high to char the paper, it will be noticed on the *back* that those parts which correspond to the dark parts, are more carbonised than those which correspond to the light parts. A similar effect may be observed with the blacks and whites of a variegated feather or a differently coloured fabric. If, during the heating of the coloured fabric, it be kept in contact with paper impregnated with cyanide of potassium, the dark parts will impress themselves more strongly than the light parts.

Fabrics of various materials shaded in black and white or in various colours, similarly impress their images on sensitive paper prepared with both silver and gold salts, but this image is very variable; generally speaking, the dark parts print best, but frequently, also, it is the white parts which produce this effect. The image produced by each colour has a character and intensity of its own, the variations, doubtless, depending on the nature of the colouring matter, and the mordant employed to fix it, as well as on the composition of the sensitive paper. Indeed, colours produced by the same colouring matter fixed side by side by means of different mordants, produce very unequal and varying impressions. Garancine, for instance, applied to cotton, gives a red dye when fixed with a mordant of alumina; a violet dye with any iron salt; a dark brown or reddish brown with both iron and alumina, according to the proportions of each: the red impresses itself more strongly than the other shades on paper prepared with chloride of gold. In cases where white designs are obtained on a coloured ground by means of acids, it is sometimes the white parts, and at others the ground, which leaves an impression on the sensitive paper. On cotton coloured blue by means of indigo, and having white spaces, it is the blue ground which is reproduced, the white parts not being affected; whilst, if the cotton be coloured with Prussian blue, it is the white parts, on the contrary, which give an image, the blue parts being comparatively inert. If stripes of indigo and Prussian blue be placed side by side on a surface of paper or porcelain, it will always be the indigo which will produce an impression, and not the Prussian blue. The following is a convincing proof, which shows the great influence possessed by the intimate nature of the colouring matter or of the ink. I have seen two engravings from the same plate, but printed with different ink, one giving a positive, and the other a negative impression on paper prepared with chloride of gold.

I have attempted to obtain impressions of an image in the focus of a lens which should concentrate the calorific rays emanating from a heated body; but the result of my attempts has always been negative. I do not know whether the images formed in the focus of a concave mirror will prove to be more active; at present all seems to show that direct radiation without the intervention of any medium is an indispensable condition of success under certain circumstances.

The action which gives rise to the thermographic action is without doubt of a very complex character: the calorific radiations have much to do with it, but the material vapours emanating from the heated objects doubtless play their part. In the case, at least, of metals and dry wood, copied in spite of the intervention of a thin and continuous sheet of mica, silver, or copper, provided that the image be strong enough and the temperature sufficiently elevated, the action of the calorific radiations preponderates; and I think it is established that a sufficiently high temperature is capable of producing effects analagous to those which we daily see light produce, such as the reduction of salts, gold, or silver, the alteration of colours, &c. &c.

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* Presented to the French Academy, May 23, 1859.

The luminous and calorific action can sometimes interfere or unite to produce simultaneously the same effects; but they are frequently distinct and separate, as MM. Bouilhon and Sauvage have recently proved.

I will terminate this paper with some details respecting the preparation and employment of sensitive paper in thermography. Prepare beforehand two solutions, one containing 4½ grains of fused nitrate of silver to the ounce of water, and the other of chloride of gold of the same strength. The sensitive paper, with nitrate of silver only, is prepared in the usual manner. That containing both silver and gold salts is prepared by floating a sheet of Swedish filtering paper on the solution of nitrate of silver, holding it by one corner; dry it gently before a fire, taking great care not to scorch it; and when it is perfectly dry, float the previously prepared side on the solution of chloride of gold, and dry it a second time, without allowing the temperature to reach 212° Fahr., since at this temperature the paper darkens.

To obtain an image, place the print with its back in contact with the plate heated with boiling water; on the face lay the sheet of sensitive paper, quite dry, and cover the whole with a sheet of glass some millimetres thick. On looking through the glass the image will appear in a few minutes. It is the more sharp in proportion as the paper is drier and less sensitive; if it be not sufficiently distinct, it may be forced out by exposing the sheet of paper to the radiant heat from a fire; if the image is very vigorous and stands out boldly from a nearly colourless ground, it may be fixed by treating it with a solution of hyposulphite of soda, to remove those portions of the gold and silver salts which have not been reduced by the heat. Paper rendered sensitive with both the silver and gold salts will not keep in darkness; it must therefore be only prepared as wanted, and be used at once.

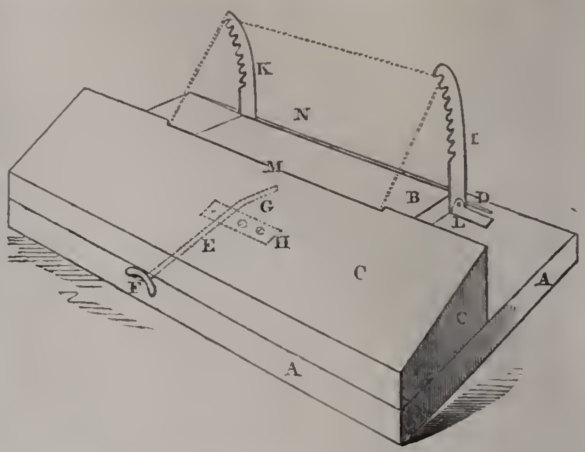
Paper prepared with very dilute nitric acid (1 per cent.), or with a solution of 45 grains of cyanide of potassium to the ounce of water, is sufficiently sensitive to yield thermographic images, but only at a much higher temperature than 212° Fahr.

Let me be permitted, in conclusion, to state that the experiments described in this new memoir date from the month of January last. At that time I showed thermographic images to several members of the Academy, and on the 29th of January I performed before Mr. Wheatstone some experiments which are mentioned in *Cosmos* of the 11th of February. On his return to London Mr. Wheatstone mentioned what he had seen produced before his eyes in my laboratory in the Louvre; and the editor of the "Photographic News," Mr. Crookes, thus noticed this experiment in his number of the 18th of February, 1859:—"Having prepared a paper with nitrate of silver and chloride of gold, M. Nièpce placed a negative upon it, and inclosed the whole in a frame and submitted it to the action of heat. We have before us pictures obtained by these means."

INSTRUMENT FOR REPAIRING FAULTS IN NEGATIVE STEREOGRAMS.

This apparatus fulfils very effectually the purpose for which it was contrived—that of allowing the artist to work in a comfortable position at the very nice task of removing imperfections in negative stereograms, while it gives him entire control in the direction and strength of the light passing through the picture.

A A is a piece of wood, about 12 inches long by 9 broad, and ½ inch or so in thickness. C is another piece of wood, thicker at the one side than the other, so that its surface has a slope like a writing desk; it is 3 or 4 inches broad, and is fastened to A by two screw nails from the under side. The under side of A is covered with cloth, to prevent its scratching the table. B is a mirror, about the size of a stereographic plate, but a ¼ inch shorter; it is contained in a slight frame of zinc, from which two pivots project; one of them is seen at D. The pivots work in grooves cut in the wood, A, and are held in their places by thin brass plates not shown in the drawing. E is a brass wire, bent up at both ends; that at F is the handle. The part of the wire which is represented by the dotted lines, lies between the pieces of wood, A and C. The crooked end of the wire, G, passes under the edge of the mirror; by turning the handle, F, the mirror is made to revolve on its pivots, D, and take any desirable inclination to the table. In order that the mirror may remain in the position in which it is put, the stalk, or connecting-piece of the wire, E, is a little bent; it lies and turns in a groove cut in the piece of wood, A, and a bit of stout brass plate, H, is screwed down upon it at one side only, and, acting as a spring, it gives sufficient resistance to the motion of the wire to counteract the trifling weight of the mirror. I and K are two pieces of brass, having a row of notches at equal distances, and wide enough to receive the edge of the glass plates. They would perform their work quite well were they fixed up immovably as shown in the drawing. But, in order that the instrument may take up little room, they are movable on two joints, one of which is seen at L. The joints are of the nature of stop hinges; so that, while the racks can fold forwards along the edge of the mirror, they cannot move further back than as shown in the drawing. A groove or notch, M, is cut along part of the edge of the wood, C.



In using the instrument, one edge of the glass, N (represented by the dotted line), is put in the groove, M; its other edge is supported by the notches of the racks at a convenient inclination. The right hand holding a pencil or a needle, rests on the inclined surface of the wood, C. The handle, F, is turned, until the light from the window or lamp, which falls on the mirror, is reflected through the negative in a direction, and with a strength suitable for the work which is to be done. A magnifying glass is held in the left hand.

John Sang.

NEW COLLODIO-ALBUMEN PROCESS.

BY ALFRED NELSON, ESQ.

The dry collodion process I am about to describe, which is extremely simple in its manipulation, has also proved of great certainty in its results, as I think will be discovered by any one who may have a fancy to try it. In the first place we have but one immersion in a silver bath, and in the next place only one washing is necessary. Now, the nicety required in the quantity of water to be used on, as well as in its application to, a Fothergill plate after its removal from the silver bath, so as to produce a standard degree of sensitiveness, and in the Taupenot the two immersions in the silver bath, and the two washings consequent thereon, are decided objections to these, not to say a word about the wrinkling and blistering of the film so liable to occur in the dry processes at present in general use. These objections I find, in a great measure, overcome in the practice of the following method, by which, during the last couple of months, I have taken some very fine stereo. negatives, and also some large portraits.

Good flat 16 ounce glass will be found to answer exceedingly well. I say *flat*, because if there is a warp in it, breakage in the pressure frame is almost certain. When the plates are cleaned, on which there need not be one half the time or care expended that is requisite for other dry or wet processes, the chief thing to look to being the absence of dust, I coat them at my leisure with albumen, prepared thus:—

Albumen from fresh hen eggs	8 ounces.
Distilled water	2 „
Bromide of ammonium	6 grains.
Chloride of ditto	1 „
Sugar of milk	3 „
Ammonia	20 drops.

Beat up to a froth by any of the methods usually employed, let it settle for a night, and filter through sponge in a funnel. Preserve this mixture in a stock bottle with a small piece of camphor. The way I proceed, so as to insure perfect freedom from tails or streaks on the glass, is in this way:—I take two empty and clean wide-mouthed bottles, into one I put a glass funnel, having a piece of clean sponge, damped with distilled water, loosely plugged into the neck of it, through this I filter the albumen from the stock bottle until wide-mouthed bottle No. 1 is nearly full, then change the funnel to the empty wide-mouthed bottle, and proceed to coat the plates from No. 1, as if using collodion, but instead of pouring the overplus back into the bottle I pour it into the funnel, and so on until No. 1 is empty; by this time No. 2 has received its quantum of albumen ready filtered to go on with, and the funnel is changed back again to the empty bottle No. 1, and so on until the plates are done. As each plate is coated and most of the superfluous albumen drained into the funnel, I rest it on a couple of folds of blotting paper with its face to the wall, one corner only touching; then I let it dry spontaneously, which it will do very soon if the room be dry and moderately warm; if it be too warm the albumen will not flow so easily over the plate. There should be no dust flying about on the surface of the plate, for the smallest spec, as every photographer knows, is often the nucleus of a great stain. A large, loose camel's-hair brush is about the best thing for removing any particles of dust from the glass just before albumenising. The time expended in the coating of the plate is about the same as that *saved* in the cleaning of it, and when dry it may be stowed away as a clean plate ready to be coated with collodion at any time, or used at once.

The formula for the collodion is as follows:—

Ether, sp. gr. 725	5 ounces.
Alcohol, sp. gr. 800	3 „
Iodide of potassium	8 grains.
Iodide of ammonium	15 „
Bromide of ammonium	10 „
Pyroxyline ... ... about	15 „

It may be made by mixing 2 parts of good negative with 1 part of a quick working positive collodion, the film not being too porous or too contractible. Coat with this on the albumenised side, let it set a little more than for the wet process, but not so much as that recommended for the other dry ones, and immerse in silver bath, made thus:—

Distilled water	10 ounces.
Nitrate of silver	350 grains.
Glacial acetic acid	10 drops.

The plate remains in this bath for four minutes, when taken out it is put into a dish of distilled water, while another plate is being collodionised and plunged; the former plate is then taken from the distilled water and washed for about three minutes under a rain water tap, on the mouth of which a piece of fine linen rag has been tied, so as to filter the water, and also to cause the stream to run smoothly; *don't spare the water*. Then to insure freedom from all chances of foreign matter remaining on the plate, I flush it back and front with two or three drachms of distilled water, and it is ready for the drying box. Nothing is better for this than one made of tin ware, or thin sheet-iron untinned (wood I don't like), the lid of course made light tight, and having at the bottom about a half a dozen folds of blotting paper, and one or two open vessels of good commercial sulphuric acid. The glasses are put to stand all round the inside of the box, with the prepared side next the tin, one corner only touching. The acid having a great affinity for water effectually removes moisture from everything in the box, thereby rendering the plates so dry that it will be found quite unnecessary to submit them to the action of ovens, or heat applied in any other way. If the acid has been used too often for this purpose, it becomes so impregnated with water as to cause it to absorb any more very slowly, and dry the plates but imperfectly; a little heat before putting them in the *chassis*, or otherwise packing them up, will then be useful.

The exposure in the camera is about one half more than that required for the wet process under the same circumstances.

The development is conducted in this manner: first, wet the plate with distilled water, either by pouring it quickly over the surface or by dipping—the latter I prefer; then for the stereo. size, pour on from a clean glass measure four drachms of the following developer:—

Distilled water	8 ounces.
Pyrogallic acid	12 grains.
Citric acid	3 „
Glacial acetic acid	1 drachm.

When this fluid has evenly covered the film, pour it back into the measure, and add to it 5 or 6 drops of solution, nitrate of silver 10 grains to an ounce of distilled water, and proceed with the development; when complete, wash and fix with solution of cyanide of potassium 4 grains to an ounce of water, or a moderately strong solution of hypo.—I prefer the cyanide. Whichever I use, I do not experience the blistering and wrinkling of the film, so liable to occur during the last washing in some of the other dry processes. When well enough washed, dry and varnish as usual for negatives.

Dublin, May 19, 1859.

A NEW PROCESS FOR OBTAINING BLACK PHOTOGRAPHS WITHOUT THE AID OF SALTS, EITHER OF SILVER OR GOLD.

BY M. NIÈPCE DE ST. VICTOR.

TAKE a red proof obtained by the means described by me in my communication to the *Académie des Sciences* on the 12th of April last, and which I repeat here.

Prepare the paper with a solution of nitrate of uranium at ten per cent., floating it thereon from 15 to 20 seconds, and then leaving it to dry in a dark place; if, however, it be dried at the fire, it becomes more sensitive to the action of light. It may be prepared several days before required for use. The exposure in the printing frame varies, according to the intensity of the light and the negative, from 8 to 10 minutes in the sunshine, and from one to two hours on a very dull day.

On taking it from the printing frame, the paper should be washed for several seconds in warm water, and then immersed in a two per cent. solution of red prussiate of potash; after a few minutes the proof is developed of a fine red ochre tint, after which it is washed in several waters until it ceases to communicate any tinge of colour to it, and then dried.

To turn this red proof to a black, it must be transferred to a five per cent. solution of perchloride of iron, to which one per cent. of pure hydrochloric acid has been added. In the space of a few seconds the proof becomes of a greenish black; it is then withdrawn and rinsed in distilled water, when it assumes a beautiful black tone which it preserves when dry. The black is more or less intense according to the nature of the size used in making the paper. It must not be left too long in the water, especially if it be a little alkaline, because, in that case, the proof will assume a red tone, and for the following reason, viz., that ammoniacal water restores the red ochre tint, and acidulated water turns it to Prussian blue colour.

I have mentioned that the red proof may be toned to a green by means of nitrate of cobalt, and that under the influence of heat a very intense green may be obtained; unfortunately, this colour loses much of its brilliancy by hydration, and especially by the action of light. The sulphate of iron which I have suggested for fixing it, ends by turning it to a blue, which does not happen if the perchloride of iron be used without the addition of hydrochloric acid. The iron solution ought to be weak, and care must be taken that the proof is not left too long in it, that it is well washed in distilled water, and dried at the fire. It then retains a very beautiful green colour.

[A reference to our previous notice of a similar communication from M. Nièpce will show that we then mentioned a curious circumstance connected with photographs obtained with ferrocyanide of potassium, which is, that if they are exposed to light until they fade a little, the original vigour may be restored by placing them for a short time in a perfectly dark place.—Ed.]

AN INSTRUMENT FOR TAKING MINUTE MICROSCOPIC PHOTOGRAPHS.

BY M. NACHET.

The apparatus consists of a solid base analogous to the foot of a microscope, on which is fixed a small plate-holder, which acts the part of the camera. On the front of this box is fastened a tube, containing the object glass, and moved by a lever communicating with a fine adjustment, so as to allow of the object glass being moved to or fro by very small quantities at a time. This movement may be estimated by means of a scale on the head of the slow motion screw.

Behind the apparatus is arranged a tube, removable at will, to receive the body of a microscope, by means of which the required accuracy of focus is assured. To focus the object, a strip of clear glass is placed in the plate-holder, having on its anterior surface some fine lines scratched (used instead of the ordinary ground glass, the grain of which, showing in the microscope, hides the image). These lines are first adjusted to focus by moving the body of the microscope; and then the object glass, which is to form the image, is moved backwards or forwards until the image of the negative to be copied is seen perfectly sharp; it is then assumed, that the collodion or albumen plate, when put in the place of the scratched glass, will have its sensitive coating exactly in the focus of the object glass. The instrument is then ready for exposure, after some allowances are made for the greater or less thickness of the collodion films employed.—*Bulletin de la Société Française de Photographie.*

THERMOGRAPHY.

In a paper, which will be found in another part of this number, M. Nièpce speaks of paper prepared with dilute nitric acid, or with cyanide of potassium, being sensitive to "a much higher temperature than 212° Fahr." Similar preparations to the above have been long used under the name of *sympathetic inks*, the writing of which would be invisible until held to a fire, when the written parts would turn brown, and scorch at a lower temperature than the other parts of the paper. Ordinary milk will be found a very good liquid wherewith to prepare thermographic paper of this sort, as sentences written with it on a sheet of white paper are quite invisible when dry, and will remain so until the paper is held before the fire, when the writing will be at once developed, showing that the paper is more sensitive to heat in the parts touched by the milk than in other places. Regarding the subject from this point of view, it will be found that the list of substances which, when applied on paper, render it sensitive to the calorific rays will include a vast number of bodies, both of organic and inorganic origin. Milk produces a reddish stain; the juice of the cherry becomes greenish; onion juice, nearly black; lemon juice, brown; vinegar, a pale red; and dilute sulphuric acid a reddish brown. To this list may be added most vegetable liquids, and also many inorganic salts. The above substances all act in a similar manner, viz., by becoming charred themselves, or by causing the paper to char at a lower temperature than would be the case under other circumstances. The colouring matter in this case is mostly carbon separated from the paper, or from the liquid used as the ink. Several substances are, however, known, which are, more strictly speaking, sensitive to heat, such as a mixture of ammonia, sulphate of copper, and sal-ammoniac, the mark of which on paper becomes yellow when heated; when paper is written on with a solution of chloride of cobalt so weak as to be almost colourless, it becomes of a beautiful pale blue colour when warmed. Hydrated oxide of copper, which is of a pale blue colour, loses water and becomes black at a temperature below the boiling point of water. If, therefore, paper were first prepared by soaking it in solution of sulphate of copper, and then in dilute solution of caustic potassa, the pale blue hydrated oxide of copper would be precipitated in the pores of the paper, and a very gentle heat would suffice to drive off the combined water and produce a strong black colouration.

Critical Notices.

Photographic Fac-Similes of the Antique Gems, collected by the Kings of Poland and the late Prince Poniatowski—accompanied by a description and poetical illustrations of each subject. Longman and Co.

During the last few years there has been rapid progress made in the application of photography to the reproduction of works of art, and the result is that now one of the chief means by which the works of art are communicated to the public is by means of photography, and not by engraving as formerly. Many and bitter have been the complaints which engravers have urged against this new-fangled mode of transcription, but still, as a general rule, the public seem to prefer the photographic to the graphic art; not that we would for one moment underrate or disparage the beauty of the engraver's art. Should the day ever come when it should be but partially employed, or in any way neglected, none will feel more sorry than ourselves; but still, while we admire a good engraving we cannot but at the same time avow our great admiration for a good photographic copy; and we think there are very few who have any taste in art matters who will not endorse our judgment. Noting the events in the history of photography we cannot help recurring to the dire prophecies which hailed its advent—when the painter dreaded lest the camera should invade the territory of high art and poetry, and the engraver predicted for it the ignominious fate of a "nine days' wonder." We have now seen all these prophecies falsified, and in spite of them the art has progressed at such a rate as to astonish those who were its warmest admirers. Not only has the art advanced but it has carried along with it public sympathy—a sympathy which is every day becoming more and more widespread. Not only has it commanded sympathy, but it is now beginning to assert itself in such a manner that even the vigorous opponents of its youth are beginning to see for it a glorious future. The opinions of all the leading art critics seem to be that ere long it will almost entirely supersede engraving. One writer has already seen in the progress of photography "the decline of line engraving." Another says that "the days of dot and stipple are numbered." Many others express themselves in a similar manner, while the arch art dictator, Mr. Ruskin, has avowed that he would prefer a few photographic copies of pictures to a cartload of engravings. These indications of opinion clearly point to a great future for photography. It will be seen, on a little reflection, that the advantages that can be urged in favour of photography as a means of transcription far outnumber those that can be urged in favour of engraving. First, there is greater facility in transcription; and this is one of the chief drawbacks against engraving, especially in a commercial point of view. It frequently happens that a publisher wishes to issue engravings of some good picture; it is at once put into the engraver's hand, but, let him work as assiduously as he likes, a great length of time must necessarily elapse ere the plate is ready; the consequence is that by the time the engraving is ready for delivery to subscribers, many new, possibly superior, subjects have attracted public attention, and the subscribers are naturally annoyed at the arrival of a picture when least wanted. Secondly, the copy taken by photography has the great advantage over engraving of giving the possessor an exact fac-simile of the original production. Such is not the case in an engraving. Let the engraver be as faithful and careful as possible in his rendering of a picture, he cannot but impart a great deal of his own individuality into the engraving, and in many instances this is done to such an extent as to almost entirely destroy the beauty of the original master. Whereas photography, being a mechanical means, cannot but render truthfully that which is placed before it, and thus give all the original feeling, touch, and personality of the artist. It is a conviction of the truth of these remarks that has led the publishers of the work before us to illustrate it by means of photography. After alluding to the attempts to copy these gems by casts, by means of wax and plaster casts, it was found that the art public did not appreciate them. "After a great expenditure, both of time and money, the late proprietor made the acquaintance of Mr. Collis, whose attainments in the photographic art enabled him to give perfect fac-similes of these antique gems, imparting to them a tone which brings out the original design with more pleasing effect than can be done by the plaster process or *the skill of the steel engraver*." The collection consists of the whole cabinet of gems inherited by the late Prince Poniatowski, and as an illustrated work on mythology it is one of the most valuable, authentic, and unique works that ever has been published. Not only have we exact transcripts of the cameos and gems, but there is a most carefully written letter-press series of notes, from the pens of Dr. Maginn and James Preudeville, B.A. As to the historic interest and importance of this work we had better let the editors speak for themselves.

"Amongst the most valued specimens of the fine art productions of the ancients, preserved from the all-devouring influences of time, accident, and the wreck of barbarism, engraved gems stand pre-eminent in the estimation of the antiquarian and the learned in historic lore. Those antique gems which have thus escaped the common fate of ancient art, constitute the connecting link between the sister arts of painting and sculpture. While our knowledge of the degree of excellence to which the ancients attained in these last-named arts is confined to a comparatively few mutilated frescoes and statues, engraved gems have been preserved in all their original perfection and completeness; the material of which they are composed, in most instances, being imperishable. They demonstrate the high artistic talent, grace, and skill of the ancients in allegorical designs.

"These gems are equal in every particular to the finest statues, and in many particulars to the finest paintings of antiquity. They possess all the delicacy of proportion, and all the development of grace, or dignity, or terror, exhibited by the statues. As in these figured volumes is to be found all that regards the fable or the history, the ceremonies or the exercises, the customs or the habits of the ancients; and as they enable us, as it were, to see the features and feel the lineaments of those great personages whose characters and actions, as described by the historians and poets of old, have been a source of instruction and pleasure to all ages, the preservation of faithful copies of the original relics, in a form easily referred to, will doubtless be the ambition and desire of the learned and curious."

Of the photographic portion of the work we may say that generally it is executed in the best style; the defects which are here and there observable in the prints arise from circumstances over which the photographer has had no control. Of the work as a whole we can safely say that we have not seen anything yet to equal it in beauty and elegance.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—(*continued*).

The Figure.—A photographer generally places his sitter in that position which secures the greatest steadiness—a sitting posture is the most common; as in this case the figure comes forward more than the head.

Now as all projecting parts become in the camera too large in proportion to those receding, we see the reason of the body being too large. The same cause accounts for large hands in photographs, and, where the face is turned up, for the lower parts of a head, chin, mouth, nose end, &c., being too large, whilst the eyes, forehead, and top of head are too small.

If a lady be sitting in a half reclining posture, bending forwards slightly, her whole head and shoulders will be too large, her figure downwards too small. If a gentleman be sitting backwards, on the other hand, he will have his hips too broad, his shoulders too narrow; both of these positions are very common.

We must not be misunderstood as stating these things in disparagement of so beautiful a science as photography becomes in the hands of experienced practitioners; but rather let us be understood as endeavouring to point out some "effects defective," which generally are seen in photographs, especially large ones, that those who will, may, knowing the cause, obviate them; and that the colourist may correct with his brush defects which, if allowed to remain, spoil any picture. For instance, where a head is so irregular in form as to become unsightly, soften those features which are the most strikingly deformed, and reduce the head to a greater semblance of beauty. Try to discover what good points there are—for all heads have some good points—and give these their full value.

To show the better how to correct these deformities, here are some general rules for making a figure symmetrical. A well-formed female has a rather small head, long taper thin neck, narrow across the shoulders, plump bust, broad hips, short round arms, small fleshy hands, taper fingers, at every joint round and smooth. A manly figure has a larger head, thicker neck, broad shoulders, narrow hips, muscular arms, and square joints.

To Remedy Other Defects.—From the circumstance of blue and white possessing so much of the actinic principle, all fair, pale people make the brightest and best photographs; whilst the ruddy and sallow make dark ones. Often is it seen that a fair young person, with *round* rosy cheeks, produces in the picture an almost *flat* cheek, from the *red* in the cheek having produced a dark tone. This the artist will remedy by painting it up in finishing with a little body colour, white, vermilion, and carmine, or otherwise, as required to suit the complexion.

As just stated, the red or sallow face makes a dark photograph; in painting choose as light a copy as possible to paint upon. During the progress of your picture the freckles and much of the dark tone will disappear; but if, in finishing, they should be found still to show, and the blackness prevents your obtaining that brilliancy of colour required to approach nature, you may, with medium, stipple upon those places which still seem dingy and grey. This will enable you to produce the bright tints wanted, and will entirely hide any unpleasing appearance of a wrong complexion.

Draperies.—Black Cloth.—With lake and ivory-black go over the most intense shadows of your photograph, taking care to keep every fold as near as possible in its present place and form; for no amount of after pains will enable you to equal the truthfulness of a photograph in its representation of texture, or the accurate forms of folds necessary to make out the true character of the particular material represented. Having done this when dry, go over what you had touched with medium or gum. Next take ivory-black, a little lake, and white, mix well together into an opaque body, much lighter than upon comparison with cloth would appear necessary, to allow for sinking, and for the gum to be passed over, which deepens it much. With this go over the entire coat, keeping out of the black shadows already laid on.

When dry go over again with gum; then take the same colour, with more white and a little vermilion, to give the peculiar glossy colour seen in the lights of black cloth, touch them on with the colour partially dry, to give a sort of crispness of touch.

(*To be continued.*)

Dictionary of Photography.

Colour.—A ray of solar light is composed of an indeterminate number of differently coloured rays; and since, on the one hand, it is impossible to distinguish each in particular, and as, on the other, they do not all differ equally from one another, they have been divided into groups, to which are applied the terms, red, orange, yellow, green, blue, indigo, and violet rays; but it must not be supposed that all the rays comprised in the same group—*red*, for instance—are identical in colour; on the contrary, they are generally considered as differing, more or less among themselves, although we recognise the impression they separately produce as comprised in that which we ascribe to red. If a ray of light which falls upon a body is completely absorbed by it, as it would be in falling into a perfectly obscure cavity, then the body appears to us black, and it becomes visible only because it is contiguous to surfaces which transmit or reflect light. Among black substances we know of none that are perfectly so; and it is because they reflect a small quantity of white light, that we conclude they have relief like other material bodies. Moreover, what proves this reflection of white light is, that the blackest bodies, when polished, reflect the images of illuminated objects placed before them.

When a ray of white light is reflected by an opaque coloured body, there is always a reflection of *white* light, and a reflection of *coloured* light; the latter is due to the fact that, the body *absorbs* or extinguishes within its substance a certain number of coloured rays, and *reflects* others. It is evident that the coloured rays reflected are of a different colour from those absorbed, and, also, that if they were combined with those absorbed, they would reproduce white light. It is evident, from the manner in which we have considered the physical composition of solar light, that if we reunited the total quantity of the coloured light *absorbed* by a coloured body, with the total quantity of coloured light *reflected* by it, we should reproduce white light; for it is this relation, that two differently coloured lights, taken in given proportions, have of reproducing white light, that we express by the term *complementary colours.* It is in this sense we say that Red is complementary to Green; that Orange is complementary to Blue; that Greenish Yellow is complementary to Violet; that Indigo is complementary to Orange Yellow, and *vice versâ.*

It must not be supposed that a red or yellow body reflects only *red* and *yellow*—besides white light, they each reflect *all kinds* of coloured rays: only, those rays which lead us to judge the bodies to be *red* or *yellow*, being more numerous than the other rays reflected, produce a greater effect. Nevertheless, those other rays have a certain influence in modifying the action of the red or yellow rays upon the organ of sight; and this will explain the innumerable varieties of *hue* which may be remarked among different red and yellow substances.

Combustion.—When two chemical bodies unite with each other with sufficient violence to cause an evolution of heat and light, the phenomenon is called by the name of combustion; and since the air which we breathe contains one of the most energetic *supporters* of combustion, *oxygen*, the term is generally applied to the appearance presented by the rapid union of this constituent of the atmosphere with combustible substances. The terms, *combustible*, and supporter of *combustion*, are, however, indeterminate ones, since in an atmosphere of coal gas, a jet of oxygen or of chlorine would burn as combustible bodies, whilst the coal gas would become the supporter of combustion. The term, *combustion*, is frequently employed in scientific language, to signify chemical union without evolution of light and heat.

Concave.—Hollow, opposed to *convex.*

Concave Lens.—A lens bounded by a concave surface; a plano-concave lens is bounded by a plane surface on one side, and a concave one on the other; a double concave lens is bounded by two concave surfaces.

Conjugate Foci.—The two points on opposite sides of a lens, respectively occupied by the *object* and the *image*, are called the conjugate foci; and any object placed at either of these positions, will have an image of itself formed at the other point. When one point recedes from the lens the other approaches it, as is familiarly known in focussing in the camera; and when the object focussed is situated at such a distance that the rays coming from it to the camera are, for all practical purposes, parallel, the conjugate focus is at its least distance from the lens, and is then called the principal focus.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, May 31, 1859.

Photography and War! Such has been the cry for some weeks past in Paris. How odd to see the beautiful and peaceful science of chemistry brought by photography into such near relationship with the horrible art of war! Yet, so it is, at least in France, where, at this moment war is the main topic of the day. One would imagine that even the women of Paris were in a fighting mood, to judge from a *brochure* just published by Madame Dudevant (Georges Sand), entitled "La Guerre;" but that is not the case. No doubt Georges Sand was simply inspired by the example of Miss Harriet Martineau, who has lately brought out a work called "England and her Soldiers." Journalism, say some, is the offspring of war; for, according to Voltaire and some other writers, it was at Venice, during the war with the Turks, that despatches were published for the first time in the streets. The people assembled to hear them read, and paid for the intelligence a small piece of money called *gazetta;* hence our word gazette. So, all the French papers teem with news of the war at the present moment, and photographic journals among the others.

La Lumière, a paper which gives now and then a little photographic news, has sent her "own correspondent," M. Berardy, into Italy. Of course he got pretty well drenched by the incessant rain as soon as he touched Italian shores.

If anything in the world is annoying to an enthusiastic photographer, it is bad weather. Clouds make him dull and hypochondriacal, fogs produce serious illness, and perpetual rain kills him outright. M. Berardy, as soon as a few glimpses of the sun had restored him again to life, shouldered his camera, and was immediately overwhelmed by the Italians with questions concerning "*the new instrument of war*" he had brought with him—how far it would shoot, and how many men it would kill at a time! The want of supplies of photographic agents keeping him in pretty constant connection with the principal *pharmacien* of the different places he visited, M. B. was at last looked upon as a doctor in medicine, travelling with some newly invented *surgical instruments!* And, considered as such, he will, no doubt, be left unmolested, and quietly send up some interesting photographs before long.

Those who are fond of the stereoscope, and who possess a series of M. Gaudin's stereoscopic slides, taken in Italy, would be able to follow the belligerent parties step by step; or, better still, perhaps, with the stereoscopic views of Genoa, Milan, Turin, and the whole of Piedmont and Lombardy, executed very beautifully by M. Ferrier, member of the *Société Française de Photographie.* We may add that the views taken in Tuscany, Naples, Rome, Venice, &c., by MM. Alinari, Lorent, Naya, Bernard, &c., many of which figure in the present great Exhibition of Photographic Art, of which we have lately spoken, become interesting certainly at the present moment, on account of the unhappy events taking place, or about to take place, in these quarters.

Already, some months ago, the artillery officers of the guard of Versailles received photographic apparatus; laboratories have been organised for them in the French camp, and they will have orders to point their *camera* at the same time as their cannon.

We understand that M. Porro, of Paris, the able astronomer and experienced photographer, is about to make known to the French government a new photographical apparatus, especially adapted for the present war. No one could better construct such an instrument, since M. Porro distinguished himself many years ago as colonel of an engineering corps. He will favour us with a description of it in a few days.

At the theatre of the *Palais Royal* a piece of the most ludicrous nature is being represented. A certain M. Oscar Plantureux, a photographer by profession, has, by some accident or other, taken a proof of somebody's leg! No one knows whose leg it is—although it appears to be a most beautiful specimen of the kind—nor, how it came to be photographed at all! The fact is, that nothing, now-a-days, can escape the objective of a photographer. In two minutes he has ten proofs of your garden, the front of your house, the face of your sweetheart, or your wife even! After all kinds of adventures, M. Oscar at last finds out the person who belongs to the leg, the photograph of which he has possessed so long, and . . . marries her of course!

It appears that M. Dove, the eminent professor of physics at Berlin, has lately applied the stereoscope to rather a novel purpose: viz., that of detecting fradulent bank-notes. If two genuine notes be placed side by side in a stereoscope no *relievo* is obtained; but if one of them be taken away and replaced by a fraudulent imitation, certain parts of the stereoscopic image now seen are immediately observed to stand out as if solid.

This being the case with German notes, why should it not be so with English ones? and if every banker in the United Kingdom who is not already overwhelmed with stereoscopes and stereoscopic slides, does not immediately procure the above-named instrument and save himself so many thousands a-year by applying it to the above purpose, it will not be our fault.

M. Plücker, another distinguished German *savant*, has lately made known the following interesting results of some experiments on the spectrum, produced by the electric light when developed in a gas, or in a mixture of different gases.

Hydrogen gas and nitrogen were first submitted to experiment. When an electric current produced by the apparatus of Ruhmkorff developes a light in a mixture of hydrogen and nitrogen, a peculiar kind of spectrum is obtained when this light is analysed by a prism. The same spectrum is produced when two spectra obtained separately by hydrogen and by nitrogen are superposed. The same spectrum is again obtained when the induction current passes through ammonia in a gaseous state; when it is probable that ammonia is decomposed in this experiment into nitrogen and hydrogen.

M. Plücker has made similar experiments on carbonic acid gas. The spectrum obtained with carbonic acid is identical with that which results from the superposition of a spectrum produced with carbonic *oxide* into another obtained with oxygen gas. Both are the same as the spectrum obtained when the electric current passes through a mixture of carbonic oxide and oxygen gas.

One of the most interesting discoveries that have been made for some time past in mineralogy, is the following, which we owe to M. Raphael Napoli, professor of chemistry at Naples:—On examining the lava which has been emitted for more than twelve months past by Vesuvius, M. Napoli found that it contains a considerable proportion of selenium and tellurium, combined with titanium, iron, and lead. As the lava cools, the sulphurous acid vapour, which abounds in it, partially destroys these combinations of selenium and tellurium, producing a great quantity of pure selenium, which is deposited, and oxides of selenium and tellurium, which are disengaged, and emitted into the air in a gaseous state and in large proportions.

Pure selenium is thus deposited in the cavities and crevices of the lava, and in the interior of the solidified mass. No one had ever remarked this before. Doubtless selenium has often been seen in the fissures of lava; but, from its red colour, it has evidently been as often mistaken for oxide of iron.

To chemists, this discovery is of the highest interest. Both tellurium and selenium are such rare substances, that they are only known as curiosities of the laboratory, and few laboratories indeed possess specimens of either. Up to the present time tellurium has been found, but very rarely, combined with gold, silver, lead, and bismuth, in the Transylvanian mines. In appearance it resembles antimony. It was discovered in 1782, by Muller, of Reichenstein, and its principal properties were made known by the then eminent chemist, Klaproth. Selenium, which bears much analogy to sulphur, was discovered in 1817, by the celebrated Berzelius. It has hitherto been found only as a seleniuret of lead, a rare mineral, or combined in some sorts of iron pyrites. A native seleniuret of copper was discovered some years ago, and named *Berzeline*, in honour of the great chemist whose name we have just mentioned.

Before the interesting observations of M. Napoli, selenium had never been found in nature, otherwise than in combination with other bodies. M. Napoli has also described a new substance, which appears to be a combination of lead and selenium, discovered by M. Palmieri, the distinguished meteorologist of Vesuvius, in certain *fumarolle*, and which has been named *Sacchite*, in honour of Professor Sacchi, of Naples.

M. Napoli has also observed a peculiar white substance which exists in the crevices of the lava, from whence it is easily volatilised, mixes itself with the air, absorbs moisture, and falls again, forming a sort of crust on the upper surface of the beds of lava. This appears to be another combination of selenium not yet thoroughly known. These facts show us that a new mine of interesting chemical products is open at Vesuvius, and promises fairly to be a rich one.

M. Wartmann, of Geneva, announces that on the 21st of July next, about four o'clock in the morning, that is, a little before sunrise, the planets Venus and Jupiter will be very nearly in conjunction. The borders of these two brilliant planets will be only $15''$ apart, and consequently both will be able to be seen in the same field of the telescope.

This will-be-fact, which is not mentioned in the famous *Connaisance des temps*, presents, however, considerable interest, inasmuch as Venus and Jupiter are the two most brilliant planets belonging to our system. Their approach will enable us to measure photometrically their relative brilliancy, and they will form an interesting subject for a photographic proof.

NOTES FOR PHOTOGRAPHIC TOURISTS.

Sir,—I would earnestly call the attention of photographic tourists to this locality, only twenty miles from *Killarney*, and abounding with views. As Moore says—"the sweet magic of streamlet and hill" is here on every side; the mountain torrent, with its rocky bed and waterfall; the lakes studded with wooded islets and surrounded with mountains; the sweet inland river "bits," and savage rocky seashore—all are here. Midway between Killarney and Glengariff, but ten or twelve miles from Glenflesk, Gougame Barra, and Inchegelagh on the east; on the west, nearly twenty-five miles from the open ocean, though the salt water is here at our doors; on the north and south shores of this fine estuary there are many beautiful harbours—Dunkerron, Blackwater (the bridge here is a gem, and but five miles distant), Sneem, Westcove, and Derrynane (D. O'Connell's residence), on the north side; Arday, Kilmackalogue, and Ardgroom, on the south; most of these are at the entrance to the glens that seem to pierce the mountain ranges north and south, and many wild and beautiful lakes are to be found, as at Clooney, Inchequinn, and Glenmore. As one nears the sea the coast gets more and more wild and savage, and in places is only to be surpassed in grandeur by the far-famed cliffs of Moher. Of such bits as those of which I send you three prints, there are literally hundreds if one knew where to go to find them; the only drawback is that the distances are so considerable that it is always necessary to drive, and I know that that is unprofitable work, if one does not know the country and the *people here*. From where I now sit I can see Mangerton mountain and McGillicuddy's Reeks, both capped *with snow*, on this 14th of *April*, the "Reeks" rising full fifteen miles off, but from this, appearing to be but the head of a giant ladder, formed of the intermediate hills. I have never met with any one who was disappointed in his expectations here, except, indeed, he came in wet weather—a contingency by no means impossible; but they who pass through only as tourists know but little of the country; it was not till I had trod the hill-tops in search of grouse, and explored the streams and rivers for trout and salmon, that I well knew the riches of its scenery. Should any amateur photographer think of tarrying here to take away the mountains in his plate box, I shall be glad to direct him to the most desirable spots, and I would advise a fishing rod as a companion; it will fill up many a blank day not fit for camera work.

As one of the inducements to go to any particular place for photographic work is the convenience for travelling, I would mention that a "through" ticket can be got in Cork, during the summer months, to take a tourist by a four-horse car through Bandon, Inchegelagh, Gougaune Barra, and the pass of Keimaneigh, to Bantry, and on to Glengariff, where you put up for the night, then through Kenmare to Killarney, and thence by rail to Mallow and back to Cork, I think for the sum of thirty shillings or two pounds. It is allowed to break the journey at Glengariff, Kenmare, or Killarney for a month. A Kerry Man.

Kenmare, Kerry.

Photographic Societies.

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The French Photographic Society

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

The communication made by M. Homolatsch, of Vienna, in November, 1856, detailed a method of printing, the principle of which had been given by M. Bayard so long ago as 1851. The proofs, at first formed by the influence of light on chloride of silver, pretty nearly as under ordinary conditions, were afterwards continued by the action of gallic acid. The instructions given by the author were obscure and incomplete; at our request he developed them, but they were open to sundry scientific objections, and were not recommended by practice; the only proof sent was anything but satisfactory; it was therefore impossible to retain M. Homolatsch among the number of competitors.

The fifth in the order of date was Mr. John Walsh, of London. The application of his method was limited to positives on glass, and offered nothing new. The two proofs sent had all the faults almost inseparable from this process; this was therefore put aside.

Next came M. Blanquart Evrard, of Lille, with a varnishing process, which consisted in the successive and, if necessary, reiterated employment of gelatine and tannin, so as to form a compound which M. Blanquart called leather-varnish. This process, the advantages of which cannot be contested, entered, nevertheless, by its nature, in the category of mechanical and physical means, for which reason we had already excluded M. Chambard.

M. Jean Schaëfer, of Frankfort-on-Maine, presented himself on the 18th of March, 1857, with a method of fixing and toning, the good results of which you have all of you appreciated, and which many eminent photographers have taken for the effect of collodion transferred to paper. But we ought to say that it could not be admitted as the personal work of M. Schaëfer. Employment of the sel d'or of Fordos and Gelis, sizing with gelatine, application of Schœnée varnish, such was the *ensemble* known and used simultaneously by several brethren in the art, as regarded its chemical part, and still more extensively used as far as regarded its purely physical part. M. Schaefer evidently employed peculiar care in applying it, as is evident from his uniform success; but it was not a sufficient title for competing for the Luynes prize.

M. Violon proposed to produce proofs on a film of salted collodion, previously transferred, as taught by M. Bayard in March, 1857, on a sheet of paper. This method has certainly some advantages from the point of view of stability; but it was less simple, and consequently less practicable than the old, and did not allow as great a variety of tones. In short, weighed altogether, we did not recognise any practical advantages in these modifications, and sufficient conditions of indestructibility.

At the meeting of July, 1858, M. Gaumé communicated to you a method of sizing the paper, of which he had already given you specimens just two years previously. It was a real novelty, but confined all the proposed modifications to the above-mentioned sizing. The operation consisted in dissolving gutta-percha in benzoin, in decanting the clear portion of the liquor, separating the gutta percha from the benzoin by evaporation, which leaves a finely-granulated substance, then plunging the sheets of paper in a bath formed of the residuum in a state of fusion This preparation gives them a species of impermeability which doubtless diminishes the chances of an alteration of the organic matter, and, under this aspect, it might be useful; but the further treatment remaining the same, and the gutta percha bath being besides a complication, the process appeared to us to constitute a too limited advance to create a claim for the prize

Here ends the series of processes which we at once dismissed from competition for the prize. These being eliminated, there remained four competitors whose labours, by reason of their importance and the quality of the specimens produced, claimed a serious examination.

It would have been difficult to get the commission to assist at all the experiments which would be necessary; therefore, as we stated above, we confided this part of the common task to MM. Count Aguado, Bayard, Becquerel, L. Foucault, and Paul Perier, forming a sub-committee, whose peculiar operations we will describe in this section of the report.

It was arranged that each of the candidates separately should be required to operate before our eyes, without any reserve, so as to render us witnesses of all the phases of the process.

To carry out this object we met at the house of our colleague, Count Aguado, who kindly placed himself at our disposal together with all the *materiel* of his *atelier*.

We first summoned there M. Testud de Beauregard. In a first sitting he showed us only a part of his process of June, 1855, the papers having previously received, without our witnessing it, the preparation with the bichromate of potash which precedes insolation. This was a deviation from our programme to which we shall have to return. The weather was dull; the exposure in the printing-frame long; the papers, when taken out, were slightly impressed by traces of the negative. They were washed in common water, then floated in a solution of proto-sulphate of iron, again washed, then immersed in a bath of gallic acid and water. We are bound to say that the results were very unsatisfactory, and bore no comparison with the proofs presented by the author in 1855. M. Testud de Beauregard did not persist in attempting a second experiment, and hence we consider the first as decidedly negative.

At a second meeting the same gentleman was to make all the manipulations necessary to enlighten us on the subject of his communication of December, 1857. By an unfortunate misunderstanding, he arrived, as on the first occasion, with his papers ready prepared. M. Testud having placed his papers, which were of a dark grey appearance, in the printing frame, left them there some time; the sky was cloudy. Removed without having received any apparent impression, they were submitted to washings in hot water; but this final operation was to extend to such a lengthened period, that the commission could not follow it to its termination; M. Testud told us it would occupy from four to five hours. The work was finished at Count Aguado's in our absence, and the specimens obtained were forwarded to us by him. These were even less promising than those obtained by the first method, and so far removed from all probability of success, that we did not think it necessary to call another meeting for the purpose of having all the phases of the operation performed before our eyes. Was it not evident that the preparation of the paper could not under those circumstances be better than when performed by the author in his laboratory at his leisure?

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* Continued from vol. ii. p. 142.

We have now to consider the process of Messrs. Salmon and Garnier.

They commenced by dissolving 30 grammes of white sugar in the same weight of water; they then added 7·5 grammes of bichromate of ammonia, and then 10 grammes of clear albumen, in which they had introduced some particles of the bichromate. After the whole was well mixed, they poured it through fine linen, and then coated with it a sheet of paper fastened to a flat surface by means of a round hog-hair brush. In order that the film should be free from striæ or traces left by the brush, they took as exactly as possible the precise quantity required to cover the sheet of paper. That done, they warmed the reverse side of the sheet before the fire, without approaching it too closely; the drying was soon accomplished, which was ascertained by rubbing the surface slightly with the finger; this should slip easily over it, though the surface still appear a little sticky in pressing upon it. Finally, they placed it in the printing frame. The first proof, which was taken under a positive on glass, was exposed for a quarter of an hour, the weather being less favourable than it might have been. On taking it from the printing frame, the image was strongly visible by an increased intensity of the yellow-brown tone of the bichromate; they then warmed it slightly before the fire; the heat appeared to continue the action of the light, thus furnishing a means of partially modifying the tone of the blacks. The sheet being again fixed on the board, they spread finely divided ivory-black over its whole surface, by means of a thick, badger-hair brush, long enough to be flexible without being too soft, and finished the spreading and the equalisation of the film with a soft wad of cotton. After detaching the sheet from the board, and holding it for a few seconds at the fire, they immersed it carefully in common water, face uppermost, occasionally gently moving it backwards and forwards. After about a quarter of an hour, when they judged that the soluble portion of the film was detached from the paper, they removed it carefully from the water by means of two corners. The paper had, in this stage, a dirty white appearance in the lights, but presented a very distinct image. Finally, they immersed it in a bath composed of 100 parts of water to 5 parts of a strong solution of sulphurous acid (proportions which may be modified either way, the action then becoming more or less rapid).

The same precaution must be observed in handling the proof in this final bath, because the insoluble film which holds the carbon adheres but feebly to the paper so long as a previous drying has not taken place. On this account, it would be useful to dry it once between the simple water bath and that of the sulphurous acid.

In this latter solution the whites are almost entirely freed of their yellow and grey tint; we say almost, and not entirely, because, as yet, that is still the drawback of this process. The paper retains, in the high lights, particles of carbon, which no doubt adhere to the invisible asperities of its surface, which had not been smoothed down in the preliminary pressing, or which arose from the moistening of the paper at the time of the application of the sensitive film. This is the chief difficulty which remains to be overcome, but not the only one: the half-tones leave something to be desired as regards roundness; in views, the most delicate portions of the distances are inadequately rendered, often being undecided and as if scraped, and the blacks want brilliancy and homogeneousness, especially in the middle distances.

Such as they are, however, these results, though incomplete, appear to us sufficiently remarkable to merit encouragement; it is precisely their sterling value which induces us to point out their imperfections. The simplicity of the process, the field for progress and practical improvements which it opens to the sagacity of inventors, inspires us with hope and confidence in its future. We resolved, therefore, to assign to Messrs. Garnier and Salmon a portion of the second prize.

There was one candidate respecting whom we could not insist on our rule that he should operate before our eyes, separated as he was from us by the sea—we mean Mr. Pouncy. We were, therefore, compelled to make the most conscientious examination possible of his formulæ, and then to put them in practice for ourselves with all the care we owed to this brother in the art, thus judged as it were by default. But even these precautions were not deemed sufficient. It was necessary to go further; and, to insure for the examination of Mr. Pouncy's claims every desirable guarantee of impartiality, we went through the whole of the operations of his process with our own hands, as well as that of Messrs. Garnier and Salmon, whom we thus placed on precisely the same footing, the same scrupulous care being observed by us in manipulating with both processes. These comparative experiments were made by us at Count Aguado's, no stranger being present.

We first tried Garnier and Salmon's method, with substances prepared and applied in the manner described above. We then operated by the Pouncy process, not less faithfully, according to the information furnished by him in a printed prospectus referred to in our *Bulletin* of January last.

As regards artistic merit, the results were found to be equal. Under other aspects we have this to point out: the manipulations are somewhat more simple and easy in the Pouncy process. It has the advantage of admitting the employment of the negative to print from, which gives rise to the hope of greater delicacy in the counterpart.

On the other hand, the insolation was more rapid in the Garnier process. One minute the first time, one minute and a half the second, sufficed; while in the Pouncy process it required four minutes and four minutes and a half. In both cases the sun was unclouded, though more or less intense.

As to the necessity of printing from a positive, it is but just to say that, in certain applications, this may constitute a real superiority; for example, when a considerable number are wanted for publication, for which it would be of great advantage to multiply the means of printing. Besides which, the use of positives sets aside the chances of accidents which menace the negative in the hands of operators.

These different considerations left the balance so nearly equal, that it appeared to us just and necessary to put the two candidates on the same line of footing, by assigning to each a recompense in equal proportions.

(*To be continued.*)

Photographic Notes and Queries.

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THE EFFECT OF ATMOSPHERIC INFLUENCES IN THE PRACTICE OF PHOTOGRAPHY.

Sir,—I consult your journal weekly with a view of keeping myself informed of what is doing in photography; but upon one subject which I think is interesting, I do not see enough to satisfy me. Your correspondents are trying various camera-processes, wet and dry, and reporting upon their merits; they arrive at different conclusions, and I cannot but think that one cause of this discrepancy may be due to *variations in the actinic power of the light at the time of taking the pictures.* These variations effect not only the exposure of the plates, but also, in a more important manner, the action of the reducing agent in developing the image. It is not a question of whether you are to allow fifteen or thirty seconds in the camera; but rather of the quality of negative which it is possible to obtain by any exposure. On one day you get a good picture and on another an indifferent one by the same mode of proceeding.

Every experimenter in photography has, perhaps, indulged the hope of introducing a perfect process. He is enthusiastic himself, and his friends are ready to encourage him, for it often happens in such cases that success attends his efforts at the outset. By and by, however, it is found that there are some weak points in this new process, and that under alterations of temperature or light, or slight modifications of the chemicals not at first insisted on, it is scarcely so successful as could be wished. A few repetitions of such experience makes the individual very cautious in pronouncing an absolute opinion, and if he obtains a fair picture under certain conditions, he will desire to test the same process under others as nearly opposite as may be.

I am led to make these remarks, as I said before, from having observed of late to how great an extent the working of the ordinary wet collodion process is affected by changes in the atmosphere, imperfectly understood. The spring, which is now nearly ended, has exhibited such changes in a remarkable manner, so that even practised operators have been occasionally at fault. A friend once observed, in a letter to me, "Do not attend to everything which people tell you about collodion; for it is quite certain that, using one sample only, you may get every quality of picture according to the state of the light."

It was, I think, at the latter end of April, or in the first week of the present month, that we experienced several days of cloudy weather, with the wind blowing from the east—thermometer at 50° to 52° Fahrenheit. During the whole of this time wet collodion negatives came out very pale and weak, although the exposure in the camera required to produce them was not excessively long. The developer, when applied, acted slowly, and often produced some kind of blurring or indistinctness. The colour of the deposit was invariably blue.

Suddenly, on a particular day, the aspect of things changed: the wind veered round to the west, the clouds parted, and the sun began to shine. The thermometer rose as might be expected, but only a few degrees, and certainly not enough to account for the differences in the result. The amount of photographic energy in the light at this time, I can only denominate by the term, *extraordinary*. It appeared as if all the chemical rays, previously bottled up somewhere, were now let loose, and that it was only necessary to coat the plate, and manipulate in any manner most convenient, to insure a good result. Collodion which had before been condemned as weak and useless—foggy baths—decomposed developers, &c., all worked harmoniously together. Spots, comets, streaks, and lines entirely disappeared, and even the severe criticism of our old correspondent, "Universal Success," would have been satisfied. So far, all was well, but curiously to relate, on this particular occasion those chemicals on which the operator had previously placed his principal reliance, began to give indications of failing him. The actinic force literally ran riot, and intense solarisation and over-action of light ensued. Here we see the wisdom of our friend's remark, "Do not believe everything which people tell you about collodion," &c.

Much has been said latterly of *bromides* in the negative process, and advocates and non-advocates of the use of bromide have been spoken of. Perhaps it will be expected that I should class myself in the latter division; but this I am not willing to do, for I must tell you candidly that, on the occasion referred to, I found the employment of bromides to be a great resource. The first application of the pyrogallic acid to the plate evidenced such an amount of rapid action as could only consist with solarisation under a bright light. These negatives might indeed, by a stretch of the imagination, be conceived to exhibit the natural colours, for the surface appeared red, blue, green, and of almost every tint of the spectrum. Evidently the *temperature* had not much to do with this peculiarity of development, for the thermometer rose only some six or eight degrees. The actinic force itself was in an exalted state; but the particular solution of this question, Mr. Editor, I will leave in your hands, knowing that your attention has been directed to the properties of the spectrum. As a practical photographer, however, I may make one observation, namely, that when it is discussed, whether experiments of a tentative kind should be made in a bright or in a feeble light, it would be better to say—try them in both. Does any new process, favourable in other respects, lack only energy in development? Then, perhaps, it will be a good process in a bright light, although it may not succeed so well in dull weather. Or, on the other hand, have the chemicals been prepared very much with reference to those cloudy days, which, unfortunately for photographers, abound in this climate; then be not discouraged because solarisation occurs when the sun begins to shine, but rather consider how far it is possible to alter the state of the solutions, and so to meet the enemy. There are many readers of the "Photographic News" to whom this kind of advice is mere A B C; but some, it is hoped, who have not as yet become perfect, will accept a hint from your obedient servant,

F. Hardwich.

SUGGESTIONS ON THE EMPLOYMENT OF WATER GLASS.

Sir,—I thank you for your attention to my note. One use to which I think *water-glass* might be applied is, as a protective glare to photographic pictures upon glass instead of varnish, which, if I rightly judge of its properties, seems feasible; but as I have not yet been able to procure the article, it is only a guess, and I need scarcely say that theory and practice should go hand in hand.

Should the above application be found not to answer, it would be serviceable to photographers as a cement for glass, in the case of broken baths, or the manufacture of flat dishes, or other articles which a photographic handicraftsman will readily make for himself. The uses to which it may be applied are multifarious, independent of photography. I have known, for some years past, of a method of painting termed Stereochromie, principally practised in Germany, as superior to fresco, wherein it forms the main ingredient.

Lately, I read an account of the formation of a company called "the Metropolitan Water-glass Company," for the supplying of water-glass, stating also that thay had issued a pamphlet descriptive of its properties and uses.

Inquirer.

[The following is the method of preparing "soluble glass" or "water-glass," as given by the inventor of Stereochromie:—Fifteen parts of powdered quartz are ignited with 10 parts of crude potassa and one part of charcoal (which decomposes and expels the sulphuric acid contained in the potassa) till perfect vitrification takes place. The hard, blistered, greyish black mass thus obtained is pulverised, then boiled with five times its weight of water (which dissolves slowly, but almost entirely in the course of four hours), and the solution is finally evaporated. If the residue on evaporation be heated till it fuses, it loses water and becomes a hard, transparent, rather fusible glass, which, on exposure to the air, absorbs so much water that it swells up strongly when heated. The substance obtained by simply drying the solution is colourless, transparent, and brittle, with a conchordal nitreous fracture, but softer than glass. It has a slightly alkaline taste and re-action, and, after thorough drying, contains 26 per cent. of potassa, 62 of silver, and 12 of water. The salt is permanent in the air; does not absorb carbonic acid from it; and effloresces only when accidentally mixed with other salts of potassa. In the fire it swells up from loss of water, then fuses and forms anhydrous soluble glass. Dilute acids decompose it, with separation of silica, more easily than concentrated acids. It dissolves but very slowly in cold, but readily in boiling, water.

A concentrated solution, containing 28 per cent. of anhydrous soluble glass, is syrupy, tenacious, somewhat turbid, and of Sp. Gr. 1·25. On boiling, or on exposure to the air, it becomes covered with a tough skin, which disappears when thrust beneath the liquid. After evaporation at a high temperature, it becomes very tenacious, and may be drawn out into threads like melted glass. It dries up to a varnish when spread upon wood, &c., the combustibility of which it diminishes. A dilute solution absorbs carbonic acid from the air; a concentrated one, scarcely at all. From the above particulars, which are taken from a paper by M. Fuchs, the inventor,* our readers will see that soluble glass is likely to become a valuable adjunct to photographers, and we hope that the information thus given will enable "Inquirer" to pursue his contemplated experiments to a successful termination.—Ed.]

PRINTING PROCESS.

Sir,—Should you consider the following process for printing stereograms worth inserting in the "News," I can testify to its giving excellent results, and as the prints do not in the least decompose the fixing bath, there can be no deposit of free sulphur upon them, which is the main cause of fading. The formula for the toning bath was communicated to me more than twelve months since, and I have found it so good, that I never use any other.

I sensitise the albumenised paper by floating for five minutes on a bath of the proportions of 50 grains *fused* nitrate of silver to the ounce of distilled water. I find the fused nitrate gives richer proofs than a much stronger bath of the common crystallised. It soon, however, becomes discoloured, and when dark enough to tinge the paper, it should be filtered through kaolin. It should be kept in a bottle with a black covering, and in the dark, and the strength should be kept up by adding fresh silver occasionally. After sensitising, hang up the papers by American clips to dry, with a strip of blotting paper on one corner, and when dry put the papers into a book; they will keep good for two or three days in the dark room. Print *deep*, and wash in three waters; then soak for five minutes in water 20 ounces, ammonia, 1 drachm. Wash slightly, and tone.

The Toning Bath.—Put into an imperial quart bottle 40 ounces distilled water, to which add half an ounce of pure bichromate of soda. This is No. 1, and will keep any length of time.

Dissolve 15 grains chloride of gold in 15 drachms distilled water. This is No. 2, and should be kept in the dark.

For use, put 10 ounces of No. 1 into a bottle, to which add 1 drachm of No. 2. Tone to the required colour, and fix in a bath of filtered rain water, 20 ounces, hyposulphate soda, 6 ounces. Great care must be taken not to touch the toning bath with the fingers that have touched the hypo.; this is easily avoided. When the whites are perfectly clear, wash the prints in several waters, and soak for 24 hours, changing the water occasionally; then blot off and hang up to dry; when quite dry burnish the back of the prints with an agate burnisher.

This formula will, I think, be very useful to the amateur who may have but a few prints to tone at a time, as any quantity of the toning bath may be mixed—just sufficient for the number of prints—in the proportion of 6 minims of No. 2 to 1 ounce of No. 1; and as the bath will not keep, this is economical. When a small quantity only is mixed, the prints should be toned by pouring a sufficient quantity on to a clean plate of glass; place the print face downwards, and pass a glass rod over the back to drive out air bubbles; let it remain for a few minutes, then turn it, and keep the liquid evenly over the surface until toned.

Thomas Barrett.

THE FOTHERGILL PROCESS.—ACETIC ACID IN THE POSITIVE EXCITING SOLUTION.

Sir,—I should be glad to know if in the Fothergill process, after sensitising and then putting the plate in a bath of 5 grains to the ounce of nitrate of silver, it is necessary to use a two or three drachm wash, or whether this will render the plate less sensitive than the old-fashioned way of using the 4-drachm wash after the first (and only) bath? I prepared a plate to-day, and first sensitised it, then dipped it in a 5-grain bath till the oiliness disappeared, and then, without washing, poured over it gum water and chloride of ammonia; after drying, I took a first-rate portrait in *ten seconds* in a shady place. I have frequently taken them in thirty seconds with a half inch stop.

The chloride of ammonium with gum water is an immense improvement, as it reduces the exposure to one-half or a little less, but not so low as one-third, as a recent correspondent states.

I also find in the printing process that 5 drops of acetic acid to the ounce of silver in the nitrate bath, gives far better pictures than a neutral bath, but it renders the paper a *little* less sensitive. This is compensated for by its admitting of the paper being kept for several days, which a neutral paper will not do—to be *good*.

S. S. B.

SPLITTING SELENITE.

Sir,—I have a set of sheets of selenite for making objects for the polariscope, and cannot succeed in *splitting them evenly*. Can you advise me?

J. W. W.

[A particular kind of selenite is used for this purpose. It is found somewhere near Paris, and has more the appearance of mica than the ordinary selenite. A good plan of splitting it into even films, is to insert a sharp instrument at the edge so as to start the split, and then to insert a drop of spirits of wine in the split, and gently warm the crystal—the separation then spreads of its own accord. This, though a tolerably good plan, has never yielded us such large films as we have seen prepared by regular opticians. We believe there is a secret in the art of splitting sheets of selenite evenly, which is only known to a few persons.—Ed.]

THE FOTHERGILL PROCESS.

Sir,—Should any of your readers entertain a doubt as to the keeping properties of the "Fothergill plate," I beg to inform them, through the columns of your widely circulating paper, that in October last I purchased one dozen of these plates. I shortly after exposed and developed four, and the result proved satisfactory; not having time then to use the remainder, I put them aside. To-day, being at leisure, I have printed some positives on several of the same batch, and I find that in each instance the plate is as sensitive, and developes as quickly and free from stains as those used in October last. The time of exposure was four seconds in the shade. I do not know when these plates were made. I have had them in my possession upwards of six months.

N. T. A.

COLLODION PICTURES DISSOLVED BY THE VARNISH.

Sir,—The dissolving away of pictures that your correspondent complains of, may be obviated by the use of another collodion and French spirit varnish. I had several good pictures spoiled in that way whilst using one particular collodion, but have never experienced the like result with any other collodion.

How far I may be correct, I can't say, but I attribute it to there being too great a quantity of alcohol in proportion to the ether in the collodion, and to the pyroxyline being very soluble in spirits of wine.

J. B.

THE HON. MAJOR FITZMAURICE'S NEW LIGHT.

Sir,—You have kindly given us information about the splendid new light of the Hon. Major Fitzmaurice, by inserting the letter of your correspondent from Blacklock; but that gentleman, though he tells myself and brother photos. that the Grand light can be packed in a portmanteau, and that the Domestic is the size of the moderator lamp, contrives to leave us effectually in the dark as to where this photographic treasure is to be seen, procured, or how made. I am sure your editorial pen could not be enlisted in a better cause than in the endeavour to procure some really tangible information on these points for your thousands of subscribers, of whom, I am sure, there are many who would most gladly avail themselves of it, as well as yours very truly obliged,

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* Kastn: Arch: v. 385.

W. L. C.

SUBSTITUTE FOR A GLASS ROOM.

Sir,—In reply to your correspondent "Beta's" note respecting the calico tents, I can inform him that my calico was brushed over with the solution of white wax and turpentine in May of last year, and remained exposed to the weather till the end of October, and was then perfectly waterproof.

Henry Doubleday.

ANSWERS TO MINOR QUERIES.

Syrup of Iodide of Iron.—*Scientia.* The following is a good formula for preparing this syrup:—Take of dry iodine, 200 grains; fine clean iron wire, 100 grains; water, 6 ounces; white sugar, in powder, 4½ ounces. Boil the iron, iodine, and water together in a glass flask, at first gently, to avoid the expulsion of iodine vapours, afterwards briskly, until about two fluid ounces of liquid remain; filter this quickly, while hot, into a flask containing the sugar; dissolve the sugar with a gentle heat, and add water to make up to six fluid ounces.

Portable Levelling Stand.—*Emery.* Several ingenious and efficient levelling stands have been described in our columns; perhaps, however, the following one, for which we are indebted to a suggestion of Mr. Stewart, will be found to answer the desired purpose. Take three pieces of brass rod, about four inches long, and fasten them together in the form of an equilatural triangle, by means of long coarse threaded brass screws, pointed at the end. By means of these any vessel supported on the triangle can easily be brought to a level; and when required to be packed up, the removal of a screw will allow it to fold up into the compass of an ordinary pocket ruler.

Cyanogen Soap.—*F. R. W.* We do not know the composition of the article owning the above name, but the following is a very good receipt for a similar thing:—

Cyanide of potassium	1 ounce.
Iodine	1 drachm.
American potassa	2 ounces.

Powder the above well and then mix with them sufficient bath brick and water to make the whole into a paste; and preserve in a well corked bottle, and label "Poison."

Deposit on the Surface of Prints while Toning.—*J. H. U.* The deposit upon the prints when toning in the gold bath, as described at p. 86, vol. i., and p. 15. vol. ii., may arise from not following out the directions there given. It is possible, though not very probable, that the chemicals are in fault, or the water contains some injurious salts. The most likely cause of such deposit is the ammonia in the print uniting with the gold, and so forming "fulminating gold," a yellowish brown substance, which is deposited on the addition of ammonia to the chloride of gold. Has J. H. U. suffered any ammonia to get mixed with the gold bath? or has he neglected to wash it from the ammonia before placing it in the toning bath? Not more than two or three drops of ammonia to an ounce of water should be used in the bath before toning, and it should then be washed for about one or two minutes—the gold and carbonate of soda should not be mixed with anything but pure water; and if these directions are attended to, and the results are not uniformly good, the chemicals are in fault.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Stereoscopic Exchange Club.—Mr. J. E. Coward writes to us as follows:—"Dear Sir,—When I joined the Photographic Exchange Club, I stated to you that I was going to leave England in about a month; this period has now elapsed; and as I leave to-morrow, I think I ought to acquaint you with the fact—to prevent, if possible, any more being sent to my address without the chance of returning them, especially as I received one only yesterday. I must express myself thankful to you for having instituted a society of this kind, having received much courtesy from its members generally (as well as many most beautiful and interesting specimens), and wish I had the opportunity of returning them my thanks. With some few, in my new home (S. Africa), I have agreed to make further exchanges, and hope to obtain there some negatives of subjects distinct in their character from those obtainable here." Mr. J. Sang, of Kirkaldy, has also written to say that he wishes to withdraw his name. The following names of gentlemen who wish to join, have been forwarded to us since the publication of the last list:—J. Partridge, 146, High Street, Southampton. (Two or three pictures.)—Hugh Robert Rump, Wells-next-the-Sea, Norfolk.—W. B. Harwood, Chiddingfold, near Godalming, Surrey.—A. Nelson, 11, Upper Sackville Street, Dublin.—L. J. Gaskell, 14, Stanley Street, Macclesfield.—Alex. Henderson, 3, Inkerman Terrace, Montreal, America.—A. Taylor, Dunfermline.—J. Herdmans, Junr., Sion Mills, Strabane, Ireland.—David Storrar, Junr., High Street, Kirkaldy.—R. Mason, Bamber Bridge, Preston.—W. Child, Bushbury, Wolverhampton.

Cervus.—1. Your pyrogallic acid is rather discoloured; but it will do very well for any but the most delicate photographic work. We have constantly used it in a similar state, without noticing any inferiority in the results. You will not be able to resublime it, as very great experience and special apparatus is required for that purpose. 2. Most large works on chemistry treat of the manufacture of benzol. It is obtained from coal tar naptha by distillation, the portion which comes over first being reserved for further rectification.

Pier.—Apply at the address of the French Photographic Society, Rue Drouot, 11, Paris.

Chloride.—1. We cannot advise you whether to procure a license or not; it must depend on your own ideas on the subject. 2. A portrait lens used for landscape purposes, has a tendency to give an excess of light towards the centre of the picture. 3. Try the effect of adding a few crystals of nitrate of silver to your bath. 4. You may delay the fixing after your pictures are developed, for several hours, provided you wash the developing fluid well off the surface, and keep the plates in the dark.

H. Banks.—There is too much water in the collodion; you cannot now remedy it, but must use another sample. The addition of carbonate of potassa would do harm rather than good, as it would destroy the tenacity of the film. Chloroform is of no use in such cases.

A Subscriber.—We do not think you will be able to increase the power of your telescope sufficiently to see Saturn's satellites or rings well. There is a limit to the magnifying power which an object-glass will bear applying to it; and in ordinary terrestrial telescopes this is soon reached. A method of finding the magnifying power of a telescope, was given in our first volume. By that, you will perceive that the application of a lens of a shorter focus to the eye end of the telescope, increases the magnifying power. In experiments of this sort, the telescope should be mounted on a very firm stand, and the different lenses used for eye-pieces should not be held in the hand, but mounted so as to form part of the instrument. An ordinary single lens will do for your purpose; but, for a first-rate telescope, a properly constructed eye-piece should be used.

Never say Die seems to have become very soon discouraged at the failure. "Never say Die," but try again; good pictures *have* been fixed in that way.

Bon-Accord.—We can only recommend you to consult our advertising columns; we cannot recommend particular makers.

A Pupil.—If prepared in the way recommended by our correspondent O, at vol. ii. p. 15, the toning bath will serve for use until quite exhausted.

H. Morton.—The print is a very good one in many respects. It might be a little improved by being toned rather darker; and by the light parts not being quite so intense.

C. A. E. W.—We think that if our correspondent were to add a little acetic acid to the silver bath (as recommended in previous numbers), the sensitive positive paper would not be likely to turn dark for many days, if it were kept in a well stoppered or corked bottle. Use the process given at vol. ii. p. 15.

Protosulphate.—A correspondent in our last number (p. 143) speaks very favourably of developing dry plates with protosulphate of iron.

X.—We have not tried the plan ourselves, neither do we think it would be perfectly safe; but we will inquire, and communicate the result to X. and our other readers.

P. M., Dunfermline.—Consult our previous numbers, advertisements, and matter. That is the best advice we can offer.

M. M. D.—Some parts of your letter we will insert in our Notes and Queries, as we think the hints will prove useful. 1. The process seems as if it would answer, from the description, but it is too recent for any practical experience to be brought to bear upon it. 2. Unslaked lime will absorb the water from alcohol without distillation; but it will be better to distil it off, as the spongy lime soaks up an enormous quantity of alcohol, which would, in that case, be recovered; and, also, the alcohol would dissolve sufficient from the lime to render it unfit for photographic purposes. 3. We have never tried the process, but have seen some very good things taken by its means.

Halcyon.—1. Distilled water should be employed. 2. If an oven be not at hand, some substitute must be used. 3. A single lens of a short focus. 4. We do not at present know more than is given in the author's description.

F. S. Y.—Received. Your wishes shall be attended to.

Photo.—Amber varnish is a very dangerous one to use; plates varnished with it are very liable to be injured by contact with anything at all rough; the coating of amber being very little protection against scratching. We prefer good spirit varnish, applied with heat.

S.—Your nitrate of silver evidently contains impurities; most likely *nitrite* of silver or nitrate of copper. In either case, it is unfit for photographic purposes.

Communications declined, with thanks:—S. Hunter.—A Beginner.—Oxymel.—Stereo.—P. H. I.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Waxed Paper.—G. J. W.—A Friend.—W. C.—R. Collo.—Mephistophiles.—O. O. O.

In Type:—C. T. H.—B. A. I.—Philoxymel.—Viator.—R. M. S.—Warrengal. M. M. D.—Magnum Bonum.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private"

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 40.—*June* 10, 1859.

THE STEREOSCOPE.

BY M. CLAUDET.

At the sitting of the French Photographic Society on the 21st December last, M. Hermagis presented a new memoir on the subject of the stereoscope with parallel lenses, which, in ignorance of my previous labours, he presented to the Society about a year ago as a new invention; at which time I addressed a remonstrance to the Society, which was published in their *Bulletin*.

My title to this invention was so evident and incontestable, that M. Hermagis had nothing to say in answer, and he was forced to submit to that law of priority which forms the guarantee of inventors, and prevents confusion in the history of the progress of science.

The object of the new paper of M. Hermagis appears to be, not to claim the invention of the stereoscope with entire lenses, but to explain the advantages which he believes he obtains in this system, by adapting, before the lenses, two tubes of about 2¼ inches in height, intended to correct a fault which, as I shall prove, is entirely imaginary.

M. Hermagis imagined that to obtain the coincidence of the images, the lenses ought to be inclined, and that I had adopted this inclination by which, said he, "M. Claudet returns to the system he fights against, that is to say, he re-forms the prisms, because in inclining the axes of the lenses, the eyes are forced to look through the edge of the parallel lenticular system; it is by means of the tubes, which, acting as cameras, permit our eyes to be placed in the axis of the luminous cones emerging from the lenses, that the necessity of inclining the lenses is obviated. In adapting these tubes to the stereoscope, M. Hermagis thinks he has overcome these inconveniences, and if M. Claudet, using entire lenses, has been forced to incline them, it is because he places the eyes too near the lenses. This it is which establishes an important difference between the two systems."

What will remain of all this logic when I have proved that the system of entire lenses, in replacing the prismatic lenses, in no way requires that the axis should be inclined to bring the image to the centre of each retina, and that the best method of seeing through them is to place the eyes as close to them as possible?

When the lenses are placed parallel to the images, and their axes each coincide with the centre of the image opposed to it, the visual axes only require to be made parallel to obtain the coincidence of the two images. We look through the stereoscope, as if we were looking at a distant object through an opera-glass. In both cases the visual axes are practically parallel, and it is not more difficult to give them this direction on looking into the stereoscope, than it is on looking through the opera-glass. In this position of the visual axes, each image is represented on the centre of the retina opposed to it, and from this coincidence of the two images on the centres of the two retinæ, arises the stereoscopic effect. Nothing is so easy as to place the visual axes in a parallel direction; it is only necessary for a man to imagine that he looks at an object right in front of him at some little distance off. We soon get familiarised to this method of looking through the stereoscope with entire lenses, and it is, in fact, much less fatiguing than looking through the prismatic lenses; for the refraction through this small angle does not suffice to conduct each picture to the centre of each retina; it is necessary, besides, to strongly converge the optical axes.

On careful reflection, M. Hermagis will see that he is entirely in error as to the influence of his tubes, and as to the necessity, when he does not employ them, either of inclining the lenses to obtain the coincidence of the images, or of placing the visual axis in the edge of the parallel lenticular system. Is it not evident, on the contrary, that to look at those points of the images most distant from the centre, the closer the pupil of the eye is to the lens, the less it will have to look through the edge of that lens, and the more distant it is from it, the more the optical axes will have to be inclined to the right or left; consequently, the more they will have to pass through the edges. Hence M. Hermagis's tubes, instead of preventing the visual axis from impinging on the edges of the lens, will actually produce that effect. It is impossible to deny it. The tubes which keep the eye at a distance from the lens, have the additional inconvenience of augmenting the spherical aberration, inasmuch as the edges of the image are refracted by points distant from the centre of the lens, the only point entirely exempt from aberration.

In another part of his memoir, M. Hermagis states that it is possible to obtain *the stereoscopic effect by the coalescence of two perfectly identical images.* Such a result is impossible, and I shall not find much difficulty in proving the fallacy of such a statement.

When we look with both eyes, natural objects appear separated from each other, and appear in their real relief in consequence of the sensation produced by the different degrees of convergence of the optic axes necessary to make the similar points of the two perspectives gradually coincide on the centres of the retinæ. Every distance of an object has its peculiar degree of convergence. The greater the convergence, the less the distance; and the less the convergence, the greater the distance. This sensation gives us the perception of the distances belonging to each degree of convergence of the optical axes, in such a degree, that if by artificial means, for example, by the use of the pseudoscope (or even the stereoscope, by reversing the positions of the pictures), we conduct the left image to the right eye, and the right image to the left eye, we are obliged, to obtain single vision of the different objects, to converge the optic axes, to a *greater* extent for distant objects, and *less* for those near at hand. This effect being contrary to that to which we are accustomed, reverses in our judgment the order of perception of distances, because the judgment persists in attaching to each degree of convergence the idea of distance proper to it in the natural order of our sensations. Consequently, everything is inverted; the more distant objects appear nearest, and the nearer the more distant.

The pseudoscope, invented by Professor Wheatstone, the illustrious inventor of the stereoscope, is an instrument of the highest importance in the study of binocular vision, and in the investigation of the phenomena it produces. It gives the means of proving the cause of stereoscopic relief, by presenting an entirely opposite effect by the same law of convergence.

If we examine either in the stereoscope or the pseudoscope two precisely identical images, the effect is the same in both. There can be no sensation of distance, for the reason that, in examining similar points of the two pictures, the convergence of the optic axes has not to undergo any variation, and all the planes being seen with the same degree of convergence, the resulting sensation can only give the idea of one distance alone.

We can no more obtain the stereoscopic effect by the coincidence of two precisely similar images, than by a single image. It is evident that two identical images depicting themselves one on each retina, or a single image represented on both retinæ, are in fact, precisely the same thing. In both cases each retina has the same image, the same perspective, and it is impossible that a single perspective can produce the least sensation of relief. If we examine two impressions from the same negative of the moon, or two impressions of two negatives taken at the same moment, or if we look at the moon itself, the effect in all cases is the same—that of a flat disc, without the slightest appearance of relief. No effort of the imagination can make the moon appear to us in a spherical form so long as the retinæ have the same perspective of that celestial body. But by availing ourselves of the phenomenon of the libration of the moon, as M. Warren de la Rue has so ingeniously done,* we get two pictures presenting two different epochs—two different positions: each has a peculiar perspective; and these two pictures combined in the stereoscope enable us to obtain the moon in a spherical form. But, if we look at these same pictures with the pseudoscope, the image will appear concave instead of convex.

The sensation which we experience on looking at a painting or photograph is not, it is true, without a certain illusion of distance, but this sensation is not at all stereoscopic. It is even curious to remark, that this kind of illusion is greater when we look with a single eye than when we look with both eyes. The reason of it is that, when we look at a picture with a single eye, it is under the same optical conditions as when we look at a landscape with a single eye; while, if we look at it with both eyes, we become sensible of the inaction of the angular play of the visual axes by glancing at all the parts of the picture—an inaction which destroys the degree of illusion we experienced when using only one eye, and proves to us that, instead of a real landscape, we only see a painted surface quite close to us, which we perceive to be uniform, from the constant uniformity of the degree of convergence which we employ in glancing at all the points of the picture.

I observed with pleasure, that the Abbé Moigno, one of the most competent authorities on a question of optics, replied to this singular assertion of the production of stereoscopic relief by the coincidence of two identical images, by saying, that it "in no way agreed with the theory of the stereoscope, and that the sensation of stereoscopic relief with two identical pictures was an impossible effect."

M. Quinet, who took a part in the discussion after the reading of M. Hermagis's memoir, appears to ignore the principle, the construction, and the effects of my stereoscope with entire lenses. I hope this paper will satisfy him that it is he *who is in error*, when he denies the perfection and advantages of the stereoscope with entire lenses, which represents the vertical lines in their natural regularity; while the prismatic stereoscope, as I have shown, bends all the vertical lines, and makes plane surfaces appear as if they were concave.

NEW PROCESS OF PHOTOGRAPHIC ENGRAVING.

BY M. BERCHTOLD.

In our last number we published a brief description of a process of heliographic engraving, the invention of which is due to M. Berchtold, in which the powdered resin is replaced by a system of hatching applied photographically on the metallic plate. Here is the description as communicated to us by the inventor:—

In M. Berchtold's process, the work of engraving is produced photographically, and the number of the lines varies according to the requirements of the model, and that without the intervention of the will of the operator: light itself distributes these lines, and places here five or six, there four, three, two or one, and converts them even into a hatching, according as the tones are more or less black.

The process applies equally to the different methods of heliographic engraving, photolithography, and the engraving of daguerreotype pictures on silver plates.

When the heliographic image is formed on the metallic plate, and before any solvent is applied, a glass coated with black varnish, and covered with a multitude of parallel and equal hatchings traced by means of a point which removes the varnish, is laid on the plates, which is then exposed to the action of light for a period equal to that which was required to produce the picture; this operation is repeated several times, and in every position, care being taken (*and this is the important point*) to vary the time of exposure: thus, if the first exposure was ten minutes, the following ought not to be more than four, three, two, one, or even half and a quarter of a minute.

In this way, these lines are not equally produced on all the parts of the picture, the varnish having already undergone a modification according to the intensity of the light which acted upon it in the first instance, and the luminous actions of the successive exposures combining with this first action according to its intensity.

An analogous result may be arrived at by making, by means of this streaked glass and by ordinary photographic means, a transparency, the hatchings of which crossed in every direction shall be of a different intensity, in consequence of a difference in the time of exposure to the light; and this transparency, applied only once on the metallic plate covered with a sensitive coating containing the invisible image, will give the same result as the successive exposures spoken of above.

A transparency formed by the photographic reproduction of a plane surface, covered with equal and parallel channels, gives also a very satisfactory result; these channels, forming a hatching of a graduated tone, passing from black to white, have the property of reproducing themselves on the metallic plate, already bearing a picture on its surface, with different widths according to the intensity of the tone, and thus renders the model with all its delicacy. The same result may be equally well obtained directly on the photograph before the heliographic operations.—*La Lumiere.*

THE PRESERVATION OF NITRATED PAPERS.

We announced in our number of last month that a demand for the discharge of a patent taken out by M. Marion was about to be made by Messrs. L. and H. Wulff. We are happy to state that the parties have come to an honourable understanding, and that Messrs. Wulff, from explanations that have been given them, have arrived at the conviction that it was Messrs. Davanne and Girard who brought the properties of chloride of calcium to the knowledge of M. Marion; morever, in his patent, and more particularly in the addition made to it on the 16th February last, M. Marion declared that his invention consisted especially in the slide intended for holding the preservative substance. This slide has, in fact, the advantage of being available independently of the box, and is not injured by displacement or locomotion. In the face of these explanations Messrs. Wulff at once abandoned their intention.

The means of preserving positive papers has always been considered an important desideratum, and has occupied the serious attention of most of our principal photographers, who have been more or less successful in finding means of impeding the colouring of nitrated papers. M. Laborde, who occupies a foremost place among photographers, made an exceedingly interesting communication on the subject to a scientific journal, which we are sure will be read with interest:—

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* And Mr. Fry (see vol. ii. p. 75).

"The rapid colouring of nitrated positive paper arises less from the action of the air and the mutual reactions of the substances it contains, than from the emanations of every kind to which it is exposed without our perceiving it.

"If a piece of nitrated paper be inclosed in a thoroughly clean bottle, and the cork used to close it has been used for some other purpose, it is very rare indeed that that part of the paper does not become deeply coloured which happens to be nearest to it. If a prepared paper be left for several days in the dark room in the midst of different substances, it often shows different degrees of colouring, according to the emanations it has received on the various parts. In short, since a simple paper exposed to the sun and afterwards inclosed in a tube suffices to colour a sensitised paper, one may readily conceive how many different causes there are capable of producing this discolouration. In citing this latter cause, I must observe that I have no intention of giving a peremptory opinion on such an important question, and of attributing to emanations an effect which M. Niépce regards as the result of radiations. I confess, however, for my own part, that I have some reasons for not admitting the effect of obscure radiations on the paper. However this may be, here is the simple method I have adopted for preserving nitrated paper, not for an indefinite period, but long enough for ordinary practice. When the paper is thoroughly dry I inclose it between two parallel glasses. By placing these plates of glass one over the other, the nitrated papers are pressed closely together like the leaves of a book, which to a great extent cuts off the access of external agents. The discolouration of the paper is likewise retarded by placing it in a bottle with a few bits of camphor; whereas, what would scarcely be expected, the presence of acetic acid under the same circumstances accelerates the colouring. Bromine, chlorine, and hydrochloric acid in a very small quantity, preserve nitrated papers for a considerable period; but, as they modify the sensitive surface, they can only be employed with a view to certain effects."

M. Humbert de Molard, whom we may consider an authority in photographic matters, has assured us that he has preserved nitrated paper for a lengthened period by simply putting them between sheets of paper damped; this being the case, it remains to be discovered why it is that paper, which, according to recent discoveries, can only be kept in a place which is absolutely free from moisture, is equally well preserved under totally opposite conditions.—*Revue Photographique.*

THERMOGRAPHY.

The idea of having recourse to heat as an agent for reproducing pictures, designs, print or manuscripts, has occurred also to M. Gaultier; he even told us, though rather too vaguely for us to speak of it, that he had prepared, for one of his sons, sheets of sensitised paper by means of which, with the aid of heat, this young man had been able to obtain, with great ease and facility, copies of ancient and valuable documents which it would have been difficult to have copied by hand; and which would, besides, have taken too long a time. Our readers will remember that M. Gaultier embodied his idea in a note which he deposited, on the 7th March last, in a sealed envelope, in which it was stated that "Papers sensitised with the aceto-nitrate of silver, with nitrate of uranium, with a mixture of gelatine and bichromate of potash, placed for a greater or less length of time, from twelve minutes to an hour, under a sheet on which characters are traced, and heated to from 212° to 250°, reproduced those characters perfectly if they were traced in black ink, but only faintly those traced in red ink."

M. Niépce de St. Victor having been somewhat alarmed lest M. Gaultier should claim priority over his thermographic experiments, took care, in his last memoir, to prove, by authentic documents, that his first essays were made previous to January of this year. M. Gaultier writes to say that he has no desire to dispute the prior claims of M. Niépce, but it seems to him that he may fairly lay claim to the merit of having conceived a similarly happy idea, and having realised it by applying it to the reproduction of old and original writings. If M. Gaultier reads *Cosmos* he ought to have seen that an American, a Mr. Page, had realised a similar application, on a much larger scale, before him; that the first thermographic reproduction of imprints dates back more than ten years; and that the merit of it is due to Mr. Draper of New York.—*Cosmos.*

Critical Notices.

Painting Popularly Explained. By Thomas John Gullich, Painter, and John Timbs, F.S.A.

This is one of those little treatises which appear every now and then from the pen of Mr. Timbs, in which he treats the subject of painting in that popular style peculiarly his own. Throughout the whole volume it is not difficult to trace the hand of Mr. Timbs; he brings, as usual, from his well-stored memory those little extracts, which contain in a nutshell the essence of the subject treated. We must congratulate Mr. Timbs on his good fortune in securing the services of such an able colleague as Mr. Gullich; in the preface to the present volume that gentleman very modestly says:—"The inquiry may possibly, and not unreasonably, suggest itself—how it happened that one of the authors of this volume, to whose name 'painter' is attached, did not prefer, like Annibale Carracci, 'only to speak by works.' The answer to this is, that in him, as in many others, the natural tendency was nearly equally strong to literary as to artistic pursuits. And the observation may be ventured, though at the risk of provoking unfavourable comparisons, that many painters have been better known by the productions of their pen than by those of their pencil. In this instance, however, his literary efforts would probably have been confined to contributions to periodicals, had not an accident occurred to him which, though it compelled for a long period a comparative cessation from the practice of art, did not prevent his undertaking, with a former literary associate, a task, the accomplishment of which, they trust, will serve some useful purpose." While Mr. Gullich may not be so widely and generally known to the world at large as some of his brethren, yet he has produced works "which speak for themselves." We are sure that none of our readers who had the pleasure of visiting the Manchester Art Treasures Exhibition, could have failed to notice the glorious collection of miniatures, ancient and modern, which was there displayed. And in the modern series not the least noticed were those exquisitely finished ones by Mr. Gullich, especially that one of his present "literary associate." This fact is sufficient to show us, that, whatever opinion is expressed in the work before us on the subject of art, it is given by one who thoroughly understands his subject. Although the present volume is—in comparison with the large subject of which it treats—but small, yet it contains as clear and as succinct an account of the history of the art of painting as any work extant. That there may be more elaborate and eloquent treatises we grant, but all other works are more or less special in their characters, while this "popular history" is universal, and embraces the history of art from the earliest ages down to the present. As we have above remarked, it is easy to see Mr. Timbs' contribution in the extracts which are to be found. And we may here remark that the subject is illustrated much more forcibly than could even be done by a strictly original treatise. The compilation system, as practised by Mr. Timbs, is now extremely popular, as it saves the student the immense labour of having to peruse heavy works which possibly only contain a few extracts at all instructive. The chapters on miniature painting and coloured photographic portraits are especially interesting; and as it would be too long to treat of them in the present notice, we may possibly return to the subject in another article. Meanwhile we recommend to our readers the perusal of this extremely interesting little volume.

Lessons on Colouring Photographs.

ALBUMENISED PAPER—*(continued)*.

What remains now to be done is simply to take pure lake, black and medium, thin, and to glaze or shade between the aforesaid body-colour half tints and the intense shadows in your picture, where the transition from light to shade appears too sudden, for the purpose of rounding up the folds.

Do not allow the edges of your coat to cut black against the background, but softly edge it with light. However, if the dark guide lying beside you is strictly adhered to in these respects, the result must be correct.

In all cloths the same process must be adopted, or the following, which, however, is not so effective, but is easier of management:—Take a semi-transparent wash, say (in case of black cloth) ivory black and a little white, mixed to the required tone, wash over the whole; when dry gum over; then, with a sort of half tint, made of lake, indigo, and sepia, wash in the general anatomy of the folds. The same colour, with sepia added, and gum, may serve to touch in the deepest shadows.

In either method you use opaque colours for the lights, and transparent ones for the shadows.

Camel hair pencils are better for painting cloth; sables, being harder, are liable to leave markings, although for every other process sables are far preferable.

Curtains, and any other objects meant to recede, are made to sink into a background, by being painted thinly over, after the background is nearly finished.

Velvets.—The peculiarity of velvet is its roundness of folds, the intensity of shadow, and those shadows falling on that which in cloth fabrics would be lights, whilst the bright lights appear on the edges of folds; which latter peculiarity results from its tendency to absorb light. In the finest qualities of velvets these peculiarities are in excess.

Silks and Satins.—Satin is distinguished from silk by the heavy richness of its folds, the large and square breaks in the fold, which are broader than those of silk, the high lights, and the pure intensity of its jet-black transparent shadows. Silk, being thinner, is sooner broken in form, and, is consequently, full of every species of angular sparkling lights. It has a greater number, and therefore smaller folds.

Muslin well painted is always an agreeable object in pictures, from its transparent nature affording opportunity for much soft delicacy of colouring, as all objects appearing through it become chastened by its whiteness. The general colour of muslin is pure white in the lights, bluish half tints, thin purply tints between these and the shadow, and the shadows a soft pale grey; but the deep shadows will partake more than any other part of the colour of whatever object is underneath the muslin, because it reflects the least possible amount of its own colour there, and only shows that which is underneath. It has ever been considered difficult to paint muslin: and, we believe, from the fact that many painters do not consider sufficiently well its nature.

Indeed, there is every necessity to philosophise in everything upon which we are engaged; and never more so than in matters of art. And wheresoever a difficulty presents itself, a little reason will be found to be worth much practice.

There are people who, from extreme practice, get to paint certain things tolerably well, mostly by imitating others, but not knowing the real nature of what they attempt to do, they never get beyond a limited point of excellence.

Those who rise to excellence, are men of thoughtful character, who have a definite reason for every touch they give a work, who see and know why certain appearances in nature do exist. Those are modest men, too, for they do not attempt subjects of which they are ignorant.

In truth, it is found that a good artist, one who deserves that name, is a man of almost universal knowledge in things relative to nature and natural science, whether by intuition of genius or education.

END OF LESSONS ON COLOURING.

Dictionary of Photography.

Convex.—Rising on the exterior surface into a spherical or round form. Opposite to *concave*. A plano-convex lens is bounded by a plane surface on one side, and a convex one on the other. A double convex lens is bounded by two convex surfaces.

Copal.—A resin which exudes spontaneously from the trees *Rhus copallinum* and the *Elæcarpus copaliferus*. A third variety is also found on the coasts of Guinea, where it occurs in the sand in the neighbourhood of rivers. Gum copal is met with in the form of large, colourless, or slightly yellow lumps, opaque at the exterior, but transparent within. Sometimes it is darker, and contains insects inclosed within its substance. It is slightly heavier than water, is hard, inodorous, and tasteless, and breaks with a conchoidal fracture. Submitted to the action of heat it fuses, but at the same time decomposes, and enters into ebullition evolving aromatic vapours. In the ordinary state, it is only slightly soluble in absolute alcohol; but when boiled in it, it swells up and becomes viscid and elastic. In order to effect a complete solution, it is necessary to suspend it so that the vapour of boiling alcohol may act upon it: it then gradually fuses, and falls drop by drop into the liquid beneath, where it dissolves. It is said that this method succeeds better if the alcohol contains camphor dissolved in it. Some species of gum copal, however, refuse to dissolve with this treatment. Copal swells up and dissolves completely in ether. If it be allowed to remain in ether until it has swollen into a thick syrupy mass, then heated to ebullition, and mixed with small quantities of warm strong alcohol, the resin dissolves, on agitation, into a limpid liquid, which will now bear diluting with alcohol in any proportion. If, on the contrary, cold alcohol had been added, in quantity, at first, the mass would have coagulated, and have refused to dissolve. Copal dissolves in about 100 times its weight of petroleum, and in a rather less quantity of turpentine. When copal is fused, it becomes endowed with quite different properties. During fusion, it evolves a volatile oil and water, and the residue then dissolves perfectly well both in alcohol and in turpentine. The solution in the latter substance is often mixed with a drying oil, and then yields a hard, colourless, and transparent varnish. The best way to obtain this solution is, to place the copal, broken up into pieces the size of a pea, in a flask, and heat it gently until all the copal is fused, but in such a way as does not allow of its becoming brown. Turpentine, heated to about 120° Fahr., should now be poured, in small quantities at a time, on the melted copal, taking care to stir well the mixture. If the copal be added at once to the turpentine, it would coagulate and become insoluble. Gum copal is a very complicated mixture; no less than five distinct resins having been discovered in it. And as each of these possesses different properties, and are present in very varying proportions in any particular sample of gum, it is not to be wondered at that the accounts of its behaviour with solvents, &c., vary so much with different manipulators.

Copper.—A well-known metallic element of a reddish colour. As this metal has been fully treated of on a previous occasion, we will not further occupy space by re-describing it here. One of the most important applications of the compounds of this metal to photography, consists in the preparation of a solution of cellulose, by dissolving cotton, &c., in oxide of cuprammonium. For the full account of this remarkable discovery, see the "Photographic News," vol. ii. p. 39.

Crystallisation.—We have already at vol i., p. 255, given an account of this process, and we therefore need not further allude to it here.

Cyanide of Potassium.—This important photographic chemical is usually met with in the form of hard, white, fused lumps: these, however, are not by any means the pure salt, as in the process of manufacture large quantities of carbonate and cyanate of potassa are formed. In perfectly dry air these lumps are inodorous; in the moist state, however, they smell of hydrocyanic acid from the action of carbonic acid in the air. It has a strong alkaline reaction, deliquesces in the air, and dissolves abundantly in water. Its aqueous solution may be kept unaltered in closed vessels at ordinary temperatures. It is almost insoluble in absolute alcohol. If a lump of the fused salt be left exposed to the air at ordinary temperatures, it gradually absorbs carbonic acid, gives off hydrocyanic acid, and is converted into carbonate of potassa. The energetic action of cyanide of potassium upon silver stains, and in dissolving insoluble compounds of silver is too well known to need more than a passing allusion.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, June 7, 1859.

A CURIOUS book has just been published in Paris, called "Le Vieux-Neuf (the Old-New), or Ancient History of Modern Inventions and Discoveries," by a certain M. Edouard Fournier. It forms two small thick volumes, elegantly written, and although the work is not only incomplete but unjust, the author has evidently bestowed much pains upon it. Instead of being a history of inventions and discoveries, as it pretends to be, this book is merely a collection of curious ancient facts, more or less authentic, joined together without method, most of the work having been done before by Beckmann, and if we took all the facts it contained for gospel we should, sooner or later, feel anew the strength of the old proverb, *Errare humanum est.*

Indeed, we should not have noticed the work at all but for a chapter on photography, which occupies two or three pages of the first volume, and which may, perhaps, amuse our readers. The author endeavours to show that the daguerreotype was discovered in 1760, by a certain Tiphaigne de la Roche.

We should notice here that almost every invention of importance which is treated of in the book before us is put down to the French. Thus, the steam engine was invented by the French!—the electric telegraph by the French!—the railway by the French!—vaccination by the French!—and so on. Most wonderful people—most ingenious author! These volumes form a true parallel to those published in such a large quantity by M. Figuier, which treat of *modern* discoveries, and in which, among other absurdities, we are informed that the *town* of Boston (in America) was one of the *authors* of certain medical discoveries relating to ether! But to return to our tale:—It would appear that Tiphaigne de la Roche published a book in the year 1760, and he called this book "Giphautie," a title composed of the letters which form his own name. In the eighteenth chapter a scene is described in a palace belonging to some Genii, the chief of whom addresses himself thus to the author of the work:—

"Thou knowest that the rays of light reflected from different bodies paint themselves upon any polished surface, for instance, on the retina of the eye, on water, on glass. The Genii have endeavoured to fix these passing images. They have composed a subtle and viscous matter which dries very rapidly and hardens, by which a picture is produced in the twinkling of an eye. They spread this matter upon a piece of linen and present it towards the objects they wish to paint. The first effect of the linen is that of a mirror; one sees upon it all bodies, far and near, of which light can bring the images.

"But—that which a mirror cannot do—the linen, with its viscous coating does, it holds fast these images. A mirror reflects faithfully all objects, but retains none; our linen reflects equally well, but, moreover, holds them all. This printing of images takes place the first instant that the linen receives them; the latter is then immediately taken away, and removed to a dark place. [This passage tends to show that Tiphaigne had really made experiments with the *camera oscura*, used by Porta, in the sixteenth century, and discovered rather earlier by Leonardo de Vinci.] An hour afterwards the viscous layer is dry, and thou hast a picture, so much the more valuable, that no art can imitate the truth of it, and no amount of time efface it. [From what follows, it would appear that, not only the mere outline of objects, but their *colours* also were produced.]

"We take, from their purest source—from the body of light itself—those colours which painters extract from different materials, and which time never fails to efface. The precision of the drawing, the variety of expression, the lights and shades, the perspective, all this we leave entirely to nature, who, ever sure in her operations, traces upon our linen images which, whilst they strike the eye, confound reason, and make us doubt whether what are called realities are not mere phantoms, which impose upon sight, hearing, and feeling, or upon all the senses at once.

"The Genii then entered into certain physical details. First, relating to the nature of the viscous body which intercepts and retains the rays of light; secondly, on the difficulty experienced in its preparation, and the method of employing it; thirdly, as to the reflection of light upon this dried substance. . . . . Three problems," adds Tiphaigne, as if awaking from his vision, "which I propose to the physicists of our days, and which I leave to their sagacity."

But, even if Tiphaigne had really made any experiments tending towards photography, they, like many of the other discoveries attributed by M. Fournier to the French, were *not* the first of the kind. Our laborious friend, M. Jobard, director of the Belgian *Musée d'Industrie*, whose book in four volumes, "Les Nouvelles Inventions," is almost as full of errors and nonsense as the volumes of M. Fournier (who has borrowed very considerably from the former)—M. Jobard, we say, affirms that an old book, translated 300 years ago from the German, was found lately in Russia, and that this book (the title of which is not given) contains a description, with figures, of the electric telegraph and of photography. Again, among the old alchymists, Fabricius, as early as 1566, in his work, "De Rebus Metallicis," assures us that by means of a lens, an image of any object can be obtained upon *horn-silver* (chloride of silver). He knew that the white parts of the object were represented upon the chloride of silver in black, the half-tints in grey, the black portions being left white.

If M. Fournier had gone far enough, he would doubtless have attributed Talbot's invention of photography on paper, and Archer's invention of the collodion process, to French photographers, but he has only touched upon the subject to relate the above passage.

As we are speaking of books, old and new, we will mention the title of another which it gives us much pleasure to notice, and which we should delight to see translated into our mother-tongue. The work in question is called "Lettres sur la Création Terrestre" (Letters on Terrestrial Creation), by Dr. Ph. de Filippi, Professor of Natural History and Zoology in the University of Turin.* We have expected the arrival of this book for some time past, and we are truly rejoiced that it has at last made its appearance. Dr. Filippi wrote it in a series of letters to his daughter; they were never intended to be read out of the author's family circle, but accident has altered the case. Letter by letter was translated into French and published in some of the Paris papers. The present edition is entirely new, and reminds us at once of Liebig's admirable "Letters on Chemistry," and Johnston's well-known "Chemistry of Common Life." Its field of investigation is, however, much wider than either of these.

We have frequently heard our non-professional friends complain of the difficulty they experience in reading Humboldt's great work "Cosmos; or, a Physical Description of the Universe." Had they known the modest little volume of Dr. Filippi, a good deal of the rough ground would have been made smooth for them. These "Letters on Terrestrial Creation" form, indeed, an excellent introduction to works of a similar nature, but of a higher order.

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* Paris: Lieber and Faraguet, Editors, Rue de Seine, 13. Translated from the Italian by M. Armand Pommier.

The author passes elegantly and smoothly from one subject to another, until he has embraced in his little 8vo volume the entire terrestrial creation. Beginning with the physical description of the earth, or geographical science, he glides on to its atmosphere, its water, its chemical elements, and emerges quietly from these to unfold the mysteries and beauties of mineralogy and geology; thence to palæontology, botany, and zoology.

The distinguished professor of the University of Turin has not produced a mere compilation of known facts, methodically arranged; he has written a work which cannot fail to be understood and appreciated by all classes of readers, and in which, at the same time, the man of science himself may pick up, here and there, a novelty, or be reminded in a few elegant and easy phrases of phenomena formerly more familiar to him.

While perusing this pleasant little work, the thought struck us that if such a text were only familiar to every one, how much strife, misery, and misanthropy would be for ever prevented! What a different aspect humanity would take if men could only be taught to study and admire the works of their Creator, and to abandon the follies of their sordid ambition!

M. Gaultier de Claubry, according to our Paris contemporary *Le Cosmos*, is continuing his researches in thermography, or the art of engraving by heat. Lately, it appears, he prepared for his son, who is an excellent Greek scholar, and a pupil of the French school at Athens, some sheets of sensitive paper, by means of which the young man has been enabled to obtain, with rapidity and ease, copies of some old and precious Greek documents, which it would have been far too tedious and difficult to have thought of copying with the pen. M. Gaultier de Claubry writes to the Academy of Science here, to explain that by desiring his sealed packet to be opened some weeks ago (as we noticed at the time), he had no idea of claiming any priority over M. Niepce de St. Victor, relative to the discovery of the process; but he (M. Gaultier thought that the slight honour of having been the first to apply this discovery to useful purposes would not be refused him. *Le Cosmos*, however, shows that before M. Gaultier's ingenious applications were made, an American, Mr. Page, had already realised the problem on a large scale, and that the person to whom we owe the discovery of thermography, or the art of taking images by means of heat, is Mr. Draper, the distinguished physicist of New York.

M. E. Royer has lately made known some experiments on the crystallisation of sulphur. We will endeavour to tell them here in a few words:—Sulphur is known to take two distinct and incompatible forms according as it has crystallised after fusion, or from a solution.

Thus, sulphur which is allowed to cool in the crucible in which it has been melted, forms long prismatic needles with which we are all familiar. But if the same substance be dissolved in a liquid (sulphide of carbon, essence of turpentine, &c.), it will deposit, by evaporation, beautiful octahedrons—a form belonging to quite another system of crystallisation.

Now M. Royer has shown, by some very interesting experiments, that sulphur may be made to deposit *prisms* from a solution, if care be taken that the liquid from which it crystallises cools very rapidly, or be kept for a long time at a high temperature; whereas, if this liquid be made to cool slowly and gradually, octahedrons alone will be produced.

The liquid M. Royer experimented with is essence of turpentine, which is known to dissolve sulphur easily.

Having, for instance, dissolved a certain quantity of sulphur in boiling essence of turpentine, the liquid was immediately divided into two portions, A and B. A was made to cool rapidly, and deposited long prisms. B was cooled as quietly as possible, and deposited octahedrons alone.

By varying these experiments in a great number of manners, it is shown that prisms are deposited at about 100° or 108° (Centigrade), that is, a little above the boiling point of water. If octahedrons of sulphur are dissolved, the liquid will give prisms or octahedrons, accordingly as the cooling takes place rapidly or slowly. Moreover, if this liquid remain saturated with sulphur for some time at a temperature of 100° to 108° (Cent.), a mass of prisms are obtained, and not a single octahedron.[*]

These experiments remind us of those formerly made by other philosophers on calc-spar. If carbonate of lime crystallises at a low temperature, we obtain rhombohedrons, that is, common calc-spar. But if the carbonate is deposited from a heated liquid we obtain prisms of aragonite. This is the reason why the carbonate of lime deposited in steam-engines is aragonite and not calc-spar, as has been shown in "The Geologist," vol. i. Aragonite, even when indistinctly crystallised, is easily distinguished from the other variety of carbonate of lime (calc-spar) by its property of scratching the latter.

Another curious property which we will notice *en passant* is, that if aragonite be heated before the blow-pipe, its prisms break up with a crackling noise, and little rhombohedrons of calc-spar fly off. In making this experiment, a small sample should be chosen, and the eyes partially closed; a large sheet of paper should also be spread upon the table, to collect the little rhombohedrons as they fall.

M. Charles Martius, the distinguished botanist of Montpellier, informs us that he has discovered among some notes taken during several scientific excursions made by him at different times, a striking proof of the correctness of a theory he propounded some time ago, namely, that on mountain ranges the soil must be heated by the solar rays to a greater extent than the air; whereas on plains the contrary should be observed.

The fact is, that the rarefied air of mountainous elevations allows the rays of the sun to increase the temperature of the ground to a greater extent than the rays which fall upon the soil of a plain after having traversed air which is more condensed.

Thus, on the Alps, for instance, amidst the glaciers of Mont Blanc, at 3,050 mètres above the level of the sea, on the 22nd of July, 1846, the temperature of the air in the shade was 9°.4 (Centigrade); in the sunshine it was 11°.4; whilst the schisteous rock on which M. Martius stood, and the soil in which a variety of plants grew, showed a temperature of 29°.

These observations bear principally upon geographical botany, but they may, perhaps, become related to photography. They explain how it is that the vegetation on the highest summits of Mont Blanc is far richer than that of Spitzberg, where, in spite of a perpetual sun which lasts all the summer, the solar rays, passing through a much denser layer of atmosphere, cannot elevate the temperature of the ground to the degree that is observed at Mont Blanc, where these rays pass through more rarefied air. Here, indeed, we see in icy caverns, flowering *soldanella* and *dandelions*, with a variety of other plants which can only have received the heat necessary to vegetation from the ground in which they grow.

PAGES FROM THE NOTE-BOOK OF A TRAVELLING PHOTOGRAPHER.

Between Vilvorde and Brussels there is nothing to be seen worth mention; although, if one wishes to pass away the time, and, at the same time, see a good deal of the country, it is not a bad plan to take a conveyance from the former place to the latter, instead of going by rail. There are a great many very pretty country houses, which are pleasing to the eye, if not sufficiently striking to make the subject of a photograph; and one has a good opportunity of seeing the country people, who are as interesting as such people usually are, so long as you don't comprehend them, which, in the case of the lower classes of Belgians, very few English photographers are likely to do. For my own part, I don't care about conversing with this class of the people in any country; generally speaking, they are entirely ignorant of everything in which a foreigner feels an interest, and I have seen enough of them to know that rural innocence, such as some who live wholly in towns consider identical with life in the country, is a dream of the imagination. As an instance of the different opinions men may entertain of similar subjects, I may refer to a recent statement made by a travelling photographer—I think, Sir J. Coghill who, speaking of the interruptions offered to the photographer, by a gaping crowd surrounding his instrument when pitched in the street of a town or village, says that a good-humoured joke will generally induce individuals who crowd round the instrument to get out of the way, and even to render assistance.

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[*] Some curious remarks by Dr. Phipson, upon the crystalline form of native sulphur from Sicily, have been published in *The Geologist* (vol. i., 1858). This author has shown that the natural crystals of Sicilian sulphur have been deposited from a solution containing sulphides, or hydrosulphuric acid.

Now I will not say this sort of treatment of the many-headed may not succeed occasionally, but I have seen it fail in more than one instance; and, most certainly, it is a plan I have never adopted myself, nor one that I would recommend. The best course is, to pursue your operations without any regard to standers-by, and, if they come in your way, quietly ask them to get out of it. An Englishman has a way of making such a request, which is not likely to be resisted, infinitely more effective than any attempt to do so jocularly would be.

I found Brussels so very pleasant, that I remained there a considerable time, and took as many negatives as would of themselves have repaid a trip to the continent. The buildings in this city which are worthy of being reproduced by photography are numerous. Among those taken by me I find the following to be the most remarkable:—First and foremost, as is generally the case in the chief towns of the Netherlands, comes the Hôtel de Ville. This is a splendid building; it stands in the Grande Place, and, to be properly depicted, should be taken on a very large plate. The spire is of open gothic work, and, to the best of my recollection, above 350 feet in height. Another good picture may be made of two sides of the market-place opposite, including the house, once the Hôtel de Ville, where Count Egmont and Count Horn passed the night previous to their execution.

The Church of St. Gudule offers several interesting objects for stereoscopic pictures; and is sufficiently light to render photographic operations easy on a summer's day. Among the most interesting objects is the beautifully carved pulpit, which represents the expulsion of Adam and Eve from Paradise. The pulpit is in the hollow of the globe, on one side of which stands the figure of an angel with the flaming sword, and, on the other, death holding a dart. The whole is supported on the tree of knowledge of good and evil and the tree of life. Besides this, the view of the high altar makes an extremely pretty picture, and an interesting one may also be made of one of the chapels, that said to contain the miraculous wafers, to which a legend attaches which runneth somewhat in this wise:—A certain Jew stole, or instigated the stealing of, some consecrated wafers from the altar, and himself and sundry others of his countrymen assembled on a Good Friday in their synagogue for the purpose of insulting them, and, eventually, they stuck their knives into them; upon which, blood gushed forth, and the perpetrators of the deed were struck senseless. A Jew who had been converted to Christianity declared that he was present and saw the whole affair; and the consequence was, that certain Jews whom he denounced were seized, and tortured horribly by having their flesh torn from their bones by red-hot pincers, after which they were burnt at the stake. It is stated, and though I never happened to see it I have no reason to doubt the truth of the statement, that there is a procession of the clergy once a year, in commemoration of this extraordinary phenomenon, when the identical wafers are exhibited. The photographer who may desire to obtain a picture of this chapel, can easily ascertain which it is by asking for the Chapel of the St. Sacrament des Miracles.

I find I have a good picture of a church called the Church of Notre Dame de la Chapelle; I forget the name of the street in which it is situated, but I know it is the one along which I was driven in going from Brussels to the plains of Waterloo, as it was on that occasion it attracted my notice. At the top of the same street, also, there is another object worth taking, and this is, the Porte de Hal, a large gateway built in the gothic style, which the ruffian Duke of Alva is said to have used as a prison. It is used now as a receptacle for old armour.

Apropos of the Field of Waterloo, though a photograph of it does not offer many attractions as a picture, few English photographers who visit Brussels, and who have a day to spare for the purpose, would fail to visit it, especially as the cost of a vehicle there and back, including a fee to the driver, which would secure his assistance in any way in which he could be rendered useful, would not exceed twenty francs. The church and church-yard would make a very interesting picture; it contains the dust of a considerable number of English officers who fell in the battle. In speaking of the remains of English officers, I must not omit to mention the curious fact, that a considerable income is derived by the proprietor of the house in which the Marquis of Anglesey's leg was cut off, by showing the boot in which the leg was encased. The leg itself he inclosed in a coffin and buried in his garden, the spot being marked by a weeping willow, and a monument bearing an inscription. There are several other interesting objects to the photographer, which would occupy him at least a day in taking, but which would well reward him for his pains, by furnishing him with a series of the most interesting negatives ever produced.

Brussels itself would yield a far larger number of good pictures than those I have mentioned; but I cannot enumerate them, as, at the time I visited that city, the whole place was so crowded, in consequence of the fêtes held to celebrate the twenty-fifth year of the reign of King Leopold, that it was almost impossible to fix the camera in the streets, from the multitudes that thronged them from early in the morning till late at night, though, as I have already observed, I got a very fair number. Viator.

Photographic Societies.

London Photographic Society.—P. Le Neve Foster, Esq., in the Chair.

At the meeting of this Society, held on Tuesday last, the Chairman stated that the Secretary was absent in consequence of a serious domestic affliction; the minutes of the previous meeting could not, therefore, be read.

The Chairman then showed some prints which had been received from Mr. Horsley of Cheltenham, who declined to communicate the process by which they had been obtained. Instead of using carbon, like that ordinarily used for the purpose, Mr. Horsley had taken pigments of various colours, and the result was the pictures now before the Society. The Chairman thought that photographers ought not to stick to one process alone, but try any other which gave promise of yielding good results. Silver prints were, no doubt, very beautiful, but he thought that an undue preference was given to this to the exclusion of every new method of printing. He must again repeat his opinion that photographers would find it to their advantage to admit the possibility of other substances yielding equally good results with the nitrate of silver, and he hoped they would give a trial to the various carbon processes.

A Member (*sotto voce*): "Everybody wants everybody else to try these new processes."

The Chairman inquired if any gentleman present would favour the company with any remarks on the prints before them—but no gentleman accepted the invitation, whereupon

Mr. Malone rose for the purpose of introducing to the society a camera he had caused to be constructed for his own use. He had come down to the meeting in the expectation that a paper was to be read, but as he found that there was nothing of the kind, he should extend the remarks he intended to offer on the subject of his camera. The instrument was the result of much careful consideration; in designing it he had taken all the good points he could find in a large number of cameras he had inspected, and had combined them in the one which he had the honour of presenting to their notice. The body of his camera was similar in principle to the ordinary bellows-folding camera, and was made of leather, which, though not everlasting, would last four or five years, and would be easily mended if damaged. It rested on a solid board, to which the fore part of the camera was firmly attached by a couple of screws, and which was furnished with an endless screw for the purpose of focussing—the length of the board allowing a picture to be taken at a focal distance of twenty-five inches. By means of a sliding front the lens could be raised about three inches. The plate-holder was capable of carrying a plate 13 inches by 12, but the size he preferred was a plate 13 inches by 11, because a plate of this size was 143 square inches, one inch less than a square foot, and glass dealers were in the habit of raising the price if you wanted a plate containing more than 144 square inches. The frame in which the plate-holder slides was so constructed as to carry the focussing glass when not in use, and this he thought a great convenience, as he had seen a photographer, with a very complete apparatus in other respects, who was obliged to carry his focussing screen under his arm. There was one objection to the frame which had just occurred to him, and which it shared in common with all other frames. When the slide was raised, and laid back while the exposure was taking place, he thought it possible that a ray of light from the zenith might penetrate into the camera and fog the plate. This no doubt could be prevented by laying the focussing cloth over it, but he thought it might be better to give the groove in which it worked a slight inclination, instead of having it vertical as at present. (He illustrated his meaning by a diagram.) It was constructed with a back, which swung in one direction only. It might be objected that the apparatus would have been more portable if the board which served as its base had been hinged, but for his part he preferred it solid; it was more rigid, and allowed of the use of an endless screw, which was a very decided advantage in focussing, as the screen could be readily moved by its means, even the hundredth part of a revolution. To give greater rigidity to the camera, which, however, he did not consider necessary, he had a brass rod, which passed through a hole in the head of the camera, and screwed into its back part, the hole through which it passed being furnished with a screw, for the purpose of rendering it immovable as soon as the focussing had been accomplished. The use of this rod was optional, and it was made to slide in a groove at the bottom of the board, so that it was not at all in the way when not wanted. The wood of which the camera was made was Moulmein teak, which was lighter and stronger than mahogany, and better calculated to resist changes of temperature. He had not been requested to mention the maker's name, but he thought he might venture to do so. It was a very handsome, well-made article, combining lightness with solidity, and he thought it did great credit to the maker, Ottewill. (Some little amusement was excited during the delivery of this description, by the evident admiration of the speaker for the joint offspring of his own and Mr. Ottewill's brain, which was certainly justified, as far as the external appearance was concerned, it being a very handsome apparatus).

A Member rose and asked the cost of the camera, that being, he thought, the most essential point.

Mr. Malone replied: "Twelve pounds."

The Member: "There is nothing at all novel in that camera. I bought one precisely like it in Paris of M. Jamin only a few days ago at half the price."

Mr. Heath regretted that he had not been aware beforehand that it was Mr. Malone's intention to bring such a camera, because in that case he would have shown one far better in every respect. To begin with the board, that would have been just twice as portable if it had been hinged so as to fold up with the camera; and as to its being rendered less rigid by being hinged, that was all nonsense; it could have been hinged in such a way as to be quite as rigid, nay, *even more so* (!) than it was now as a solid. As to the swing back, if it were an advantage that it should swing in one direction, it was equally an advantage that it should swing in the other. If it were desirable that the front of the camera should be so constructed that the lens might be raised, it was equally desirable that power should be given to lower the lens to the same extent, and still more desirable that it should be capable of being moved laterally. If the rod were necessary to give rigidity to one side of the camera, it was quite as much wanted on the other. In short, the instrument was about the worst he had ever seen; all the good points of a camera it possessed only by halves, and the bad points it possessed in their entirety. It was very evident that Mr. Malone was as proud of his camera as a father of his youngest-born child; but he had invited criticism by saying that he "was armed at all points," and now—he had got it.

Mr. Davis came forward to make some observations. He thought the camera before the Society possessed no particular recommendation, and was certainly deficient in some respects in the qualities of a good camera. He thought there was no reason whatever for supposing that a ray of light could get to the plate through the opening left in the top of the camera when the slide was folded back, because the sun never shone from the zenith in this country.

Mr. Shadbolt had nothing to say in praise of the camera; on the contrary, he thought it full of faults from beginning to end. He might be supposed to have some knowledge of wood, and he was surprised to hear anybody say that teak was lighter than mahogany, the very reverse being the truth. As to the relative durability of the two woods, he could only say that every carriage which rolled along the streets of London had the panels made of mahogany, and these were submitted to every kind of temperature, and, in the case of the doors, to a great amount of rough usage, and the exclusive use of this wood for such purposes was the strongest proof that no other kind of wood answered so well, or was so well capable of resisting change of any kind. He was of opinion that the back ought to swing in both directions, but if it were necessary that it should swing in one direction only, it ought to have been in the opposite direction to that in which it actually did swing; with respect to the front part, the operator ought to have the power of lowering as well as of raising the lens, and it was still more requisite that he should be able to move it in a lateral direction. There was no novelty whatever in the camera which had been brought there for their consideration.

Mr. Malone: "I did not say that there was."

Mr. Shadbolt had not said so either. He went on to point out how essential it was in many cases that a camera should have a swing back, or have a contrivance for obtaining the same result, and drew a diagram on the board, showing the manner in which any camera might be constructed to give the effect of a swing back at a trifling expense.

(The design was a very good one, but we cannot give an intelligible description in words.)

Mr. Ennell (who, though a foreigner, spoke remarkably good English) said that he thought the camera a very good one. Considering its size (13 × 13, with a depth when closed of about 5 inches) it was very compact; and it had also some improvements which gave it a decided advantage over many of the so-called portable cameras in use at present, and notably in the frame which carried the ground glass, which in general was very likely to get broken. He had himself adopted a contrivance to obviate the necessity of removing the focussing screen while taking a picture; which consisted in fitting two knobs to each inner side of the camera, and two corresponding knobs to each side of the frame which held the focussing glass, and uniting them by means of india rubber fastenings. When the operation of focussing was completed, the frame containing the plate was thrust down into its place between the camera and the focussing-screen, the india rubber fastenings yielding so as to allow the frame to take the position which had been previously held by the screen, which again resumed its place on the plate being withdrawn. This plan obviated the risk of smashing the glass, which was always incurred when you laid it about on the grass while operating. As to Mr. Malone's idea that light might get to the plate through the crevice left in the top of the camera when the slide was folded back, this was so, unquestionably; there was no doubt about it; and it was from this circumstance that the fogging of the plate frequently arose. The French had obviated this by adopting folding-doors in lieu of the slide. He wished to say a few words with respect to himself. He had offered to the secretary to read a paper on photographic contrivances at any time when there was not more important business before the society, but as he had never heard anything further about the matter, no doubt the secretary, from the multitude of things he had to think about, had forgotten it.

Mr. **Malone** rose to reply to the objections that had been raised to his camera; but first of all he must observe in reply to a gentleman (Mr. Heath) who had complained that he had occupied the meeting with a speech three quarters of an hour long about a camera in which there was no novelty, that but for this there was every probability that there would have been no discussion at all; there was no business before the meeting and no paper to be read, so he rather thought he was entitled to their thanks for having occupied the time. As regarded the novelty of his invention, he had not claimed for it any other novelty than that of possessing more points than any that had been hitherto brought forward. He opposed the idea suggested by Mr. Davis that because the sun never shone from the zenith in this country, therefore no ray could enter the camera through the slide-opening. Suppose a white cloud were overhead, that cloud would reflect light in every direction. (Mr. Davis explained.) As to the statement made by a gentleman that a camera equal in every respect (The member: "Better!")—that such a camera as that before him could be made at half the price in Paris, why—*tant mieux pour les photographes Parisiens;* he was extremely glad to hear it. (It was very evident that he didn't believe it.) He did not ask anybody to have a camera made like his; it struck him that it was a decided success, and with the view of showing it he had desired the maker to send it down to the society's rooms; and he was very glad that he had done so, as it had enabled him to fill up a very awkward gap.

Mr. **Shadbolt** rose to ask the chairman if he thought it possible to restrain individuals from patenting processes which had long been known and practised by others, who had not thought it necessary or desirable to patent that which almost everybody knew. A case of this kind had occurred a week or two back, and such cases were not at all uncommon. He thought the president of the Society might be able to give an opinion on that point.

The **Chairman** was sorry that he was not himself able to give an opinion on the subject. He had thought very much about the matter, and was fully aware of the desirability of doing something to check such proceedings if that were possible, but he did not clearly see his way to prevent such occurrences at present.

Mr. **Hughes** wished to offer a few remarks on the subject under discussion. He thought the members present were indebted to Mr. Malone for the manner in which he had come forward that evening and saved them from having made a fruitless journey to the rooms. He concluded with some very sensible observations on the advisability of the council adopting some means of informing members beforehand of the subject that would be discussed at the ensuing meeting, so that they might come prepared to take part in the discussion, as doubtless many persons frequently came from a considerable distance to attend these meetings.

Mr. **Malone** also thought it would improve the character of the Society's proceedings if a request were made by the council to certain persons to read a paper occasionally. It was a little act of courtesy which many persons thought a great deal of, and he knew that some had been deterred from doing anything in this way solely from the feeling that if a paper were worth hearing, it was worth asking for. For his own part, he was not affected by any such scruples, and was always ready to speak without waiting to be asked.

The business, or rather discussion, having been brought to a termination,

The **Chairman** rose, and after remarking that this was the last meeting previous to the vacation, and warmly expressing his hope that they may all meet again after the vacation in increased health and strength, and with plenty of good negatives, pronounced the meeting adjourned until November the first.

The French Photographic Society.

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

A careful examination and comparison of the different systems under consideration, led to the deliberations being pushed beyond the narrow limits at first intended.

The common and primary source, the unique germ of all the processes, from which we have selected those which appeared to us worthy of reward, that is to say, of all the carbon processes, is incontestably that of M. Poitevin, and, consequently, the common father of all these inventors is M. Poitevin.

A few words will suffice to convince you of this.

In the month of August, 1855, M. Poitevin deposited at the office of the Prefect of the Seine the description of a process of photographic printing. The 15th February, of the following year, having modified it on certain points, he brought it to you.

What, now, was this method, reduced to its most simple expression? In August, 1855, application on the paper of a mixture of bichromate of potash, organic substances, and colouring matter, at one operation, before insolation. In February, 1856, application of the same substances, but in two operations, to wit—the bichromate and the organic body before, and the colouring matter or carbon after insolation. In both cases washing in distilled water, to complete and fix the proof.

Now if we follow the chronological order of the presentation, what shall we see?

M. Testud de Beauregard, in December, 1857, communicated to you a process of which the following is the *résumé.*

The use of bichromate of potash, of an organic substance and colouring matter (carbon). Only here the complete preparation, which always precedes insolation, is separated into two parts; first, immersion of the paper in the mixture of bichromate and organic matter; drying, then the spreading of the carbon. After insolation, the washing in common water. The manipulation alone varies, the principle is identical.

In January, 1858, a Mr. Sutton published a method of obtaining durable positives. This again was exactly the Poitevin method, for it contained nothing more than this:—

"Application on the paper of a mixture of bichromate of potash, organic substance, and pulverised charcoal; drying, insolation, and washing." On his own part, Mr. Sutton added an alkaline solution for clearing the image, if necessary.

The 10th April, 1858, Mr. Pouncy took out a patent in England, which was not published in that country until November, and in our *Bulletin* until the following month. If we isolate the constituent elements, we find, in substance, application on the paper of a mixture of bichromate of potash, gum arabic, and vegetable charcoal, in a single operation, before insolation. Afterwards washing in distilled water.

Finally, and to conclude this long review, on the 30th June, 1858, Messrs. Garnier and Salmon deposited in the hands of your Secretary a paper containing a process which, more or less modified by them in the interval, led to our being made witnesses of experiments in which the use of alkaline bichromate, of an organic body and of carbon, reproduced, with more or less trifling variations, a series of causes and effects which have their type in M. Poitevin's process, so that we might almost say, in truth, that if M. Poitevin had not existed, each of these gentlemen would have invented it.

Is it probable, we ask you, in presence of this severe but impartial analysis, to deny that these products, of different origins, ought all to bear, in some sort, a common trade-mark; and if we give prominence to some in our photographic world, by stamping them with a seal of honour, means should be found of associating very prominently, and even in the foremost place, the name of the initiator.

Such, in fact, was the object we proposed to ourselves, sensible as we were that our consciences could not be at rest, if, in the division of the rewards, M. Poitevin was forgotten, he being the sower, while others carried off the harvest.

It is true that M. Poitevin did not present himself at the actual competition, and that he has doubtless reserved all the weight of his merits to throw into the scales we shall have to hold next year. But if on the one hand this reserve caused us an embarrassment from which it was difficult to escape, on the other it perhaps made us more thoughtful of his interests; for it would have been a sad thing if his labours and services should remain thus suspended and finally cut off from honourable mention between the forgetfulness of a first competition and the contrary chances of a second.

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* Continued from vol. ii. p. 153.

The Duke de Luynes, who was kept minutely informed of all our proceedings, became aware of our embarrassment, and, to relieve us from it, he brought increased encouragement to our art, which still further entitles him to our gratitude. Thus, he has kindly prolonged the period for competing for the second prize of 2,000 francs until the 1st July, 1861. The same programme is maintained. As to the sum of 2,000 francs he offered us for 1858, he left it to us, with full permission to distribute it in such proportions as we pleased, for the encouragement and reward of labours made anterior to the 1st July, 1858. From that time we felt ourselves more free to act than when we were confined within our former somewhat narrow limits, and the proclamation of M. Poitevin's name at the head of the list of those to be rewarded for the discovery of new processes became a settled thing.

You will call to mind, gentlemen, that in the part of the programme relative to the prize of 2,000 francs, it was foreseen that this prize might be merited by three very distinct orders of works, that is to say, either by notable progress in the printing of proofs and in the guarantees for their preservation; by the discovery of new processes; or by a complete study of the chemical and physical actions which intervene in the processes employed, or which influence the alteration of the proofs.

If as yet we have only disposed of a part of the prize, it is not only because in the category of discovery we have not met with any progress sufficiently considerable or practical results sufficiently complete; it is also, because it appeared to us impossible to withhold a testimony of high approbation to the remarkable labours of MM. Davanne and Girard. These gentlemen had a prejudice to contend against of a peculiar kind. We entertained so high an opinion of the merits and importance of the labours of these gentlemen that we feared being carried away by our appreciation of them, and so awarding a larger portion of the prize than we ought. A prejudice of this kind rendered it infinitely more difficult for us to do them strict justice, because we feared being biassed by our friendship.

MM. Davanne and Girard's labours have extended over a period of nearly four years. In fact it was at the commencement of 1855 that they demonstrated after M. Legray, but by a more rigorous analysis, the minimum quantity of silver (5 per cent. maximum), that remained in the proof itself, and, consequently, the considerable losses resulting from the dispersion, in the residues, of the 95 per cent. not utilised. It is but just to mention, however, that in the method of utilising these residues, MM. Davanne and Girard have only simplified, without modifying in any important degree, the ways and means long since known to chemists, and subsequently to all photographers by means of MM. Barreswil and Davanne's book as well as by that of M. Legray.

About this epoch, great alteration in positives formerly distinguished for their vigour and brilliancy, excited serious alarm. To find the means of guarding against these dangers by ascertaining their cause, Messrs. Davanne and Girard subjected old faded proofs to a chemical analysis, as well as recent ones which had been purposely acted upon in a similar manner. In the different papers published by them in 1855, they showed:

"That all the faded proofs were sulphurised.

"That a good and vigorous proof was immediately altered by artificial sulphurisation.

"That, consequently, it is in the sulphur and the sulphides that the altering principle constantly resides, and hence that all the acids added to the hyposulphite being agents of sulphuration, and all old hyposulphites being sulphurated, the entire absence of both was necessary; and also that salts of gold alone should be used as the colouring agents."

In the same series of examinations they also clearly showed that all the changes were due to the combined action of sulphur and humidity. A proof was placed in a closed vessel containing dry hydrosulphuric acid, and resisted its action; but the instant that moist air was admitted, it began to show signs of alteration.

The publication of these researches was of real service to our art; for if some photographers had already given up the use of the above-mentioned process, it is quite certain that the majority continued in the old way; at present, however, this order of things is completely reversed, since, thanks to the gentlemen named, no teacher can hereafter recommend his pupils to follow the old method.

(*To be continued.*)

Miscellaneous.

HOW THE DISTANCE OF THE SUN IS ASCERTAINED BY THE YARD MEASURE.—Professor Airey, in his Six Lectures on Astronomy, gives a masterly analysis of a problem of considerable intricacy, viz. the determination of the parallax of the sun, and consequently of his distance, by observations of the transit of Venus, the connecting link between measures upon the earth's surface and the dimensions of our system. The further steps of investigating the parallax, and consequently the distance of the fixed stars (where that is practicable), is also elucidated; and the author, with evident satisfaction, thus sums up the several steps. By means of a yard measure a base line in a survey was measured; from this, by the triangulations and computations of a survey, an arc of meridian on the earth was measured; from this, with proper observations with the zenith sector, the surveys being also repeated on different parts of the earth, the earth's form and dimensions were ascertained; from these, and a previous independent knowledge of the proportions of the distances of the earth and other planets from the sun, with observations of the transit of Venus, the sun's distance is determined, and from this, with observations leading to the parallax of the stars, the distance of the stars is determined. And *every step in the process can be distinctly referred to its basis, that is, the yard measure.—Curiosities of Science.*

SEIZURE OF STEREOSCOPIC "QUESTIONABLE SUBJECTS."—Under the head "Abuse of the Fine Arts" in a weekly contemporary (the *Era*), we were exceedingly glad to read of several seizures which the police have very recently made of those vile compositions which, we are sorry to see, still disgrace many of the print-sellers' shops of the metropolis. We believe, from the indications we see, that instead of retrogressing, this bad taste in art matters is progressing. In these days of Academies and Exhibitions, there ought surely to be a purer and higher standard than these filthy pictures. We hope that the police will continue to use that vigilance which they have shown in the present instance, so that if shame does not compel tradesmen to desist from the publication of these slides, that, at least, the dread of the policeman's visit will induce the suppression of that of which higher motives should have prevented the production. If this be the case, then we may hope that the trade in this class of subject will be driven to that secret system which is now applied to the Holywell Street class of literature.

THE wearisome process between Duboscq Ferrier and others has been at last brought to a conclusion, the Court of Appeal having annulled the patent with respect to the manufacture of stereoscopes which had been granted to the former.

Photographic Notes and Queries.

ON THE EMPLOYMENT OF WATER-GLASS IN PHOTOGRAPHY.

SIR,—Perceiving in the "NEWS," of the 3rd inst., a letter of suggestion relative to the employment of silicate of soda in photography, it may perhaps, at the present moment, be worth while to record the results and some of the difficulties encountered in attempting to utilise, for photographic purposes, this otherwise valuable agent, "water-glass."

A solution of silicate of soda, containing from 40 to 45 per cent. of dry silicate, is readily procurable in commerce, in the form of a viscid, syrupy fluid. This, when diluted with about an equal measure of water, affords a solution possessing the general characters of a varnish. Applied with a brush upon any polished surface it soon dries to a transparent even film, which offers a certain amount of protection to the material beneath—bright iron coated in this way is for a time, though not perfectly, preserved from rust. Such a covering will not, however, remain unaffected on exposure to atmospheric influences. An efflorescence, due probably to the formation of carbonate of soda, is prone to appear on the surface, which, by increasing, ultimately destroys the continuity of the film. As a photographic varnish, to protect collodion pictures, its employment must therefore be deferred until some method of meeting this difficulty, or indeed of preventing the decomposition of the alkaline silicate by the carbonic acid and moisture of the air, shall have been suggested.

Some years since, in company with my friend Hr. Hambly, of Sheffield, I made experiments on the treatment of the paper employed in the printing process with soluble silica. Our plan of proceeding was to impregnate the paper, by one wash, with both silica and the chloride of sodium necessary to form the sensitive coating. We used for this purpose a solution of silicate of soda, to which hydrochloric acid was added in equivalent proportion. The proofs furnished by this process were not, however, in any appreciable degree, superior to those printed upon plain salted paper. The silicate employed alone led to no results, on account of the tardiness with which the silver compound is blackened on exposure to light.

The attention which this material is likely to receive, on account of its proposed use as a varnish, is my reason for offering these observations, unfavourable though they be, relative to the points of difference between this body and the resinous varnishes ordinarily employed.

Woolwich, June 6th, 1859. John Spiller.

BURNT-IN PHOTOGRAPHY ON PORCELAIN.

Sir,—A working man, who sometimes finds a little spare time, prefers applying himself to the beautiful art of photography to spending his time in a public-house. Like many of his class, he feels himself much assisted by the reading of the "Photographic News;" for, through it, he has obtained information which has enabled him to proceed in the art with an ease and satisfaction he could not have gained without; and it has, without doubt, prevented him from spending his time in a worse manner, for which he tenders his sincere thanks.

Seeing the kind manner in which the editor answers tyros in the art, has induced him to ask the following favour:—

What method is adopted to produce photographs (views or portraits) on porcelain, and burning in the same so as to combine with the glaze in the burning, like ordinary painting on china? A Working Man.

[We do not think much progress has hitherto been made in the above branch of photography. We shall be pleased to receive from those of our readers who may have been working on the subject, some account of their experiments, and we feel sure that they will gladly give all the information in their power to such a request as "A Working Man" has made.—Ed.]

THE OXYMEL PROCESS.

Sir,—I have for some months been practising the oxymel preservative process, nor would I abandon it for any dry process I know of, were it not for one defect; and that is, that the skies of the negatives are always completely spangled over with pin-holes. I at first imagined they arose from a too liberal a use of nitrate of silver, knowing that in the wet process I have met with them sometimes, if continuing the development too long and with too much nitrate; I, however, tried less, but with no better result.

The collodion is *not* freshly iodised; on the contrary, it is many months old. I have tried several varieties, but the pin-holes are the same in all. And as they are to be seen as soon as the development commences, I am inclined to think that the fault is due to the granular structure of the oxymel.

Now, the honey I use is the best I can procure, though certainly it is not "dripping from the comb," as is specified for oxymel generally. But if I am always to wait until I can get honey from the comb, I may wait long enough, for it is impossible to get it at all seasons of the year.

Will you, therefore, Mr. Editor, or Mr. Llewellyn, or some one of your readers who have practised this most certain and beautiful process, kindly tell me how to remedy this defect? Philoxymel.

CARDBOARD DISHES.

Sir,—Wishing to make myself a few cheap gutta percha dishes, I take the liberty of submitting to you my idea. I take some thin cardboard, cut as many sides as necessary to form a dish, dip each of them into a solution of gutta percha and benzole, and, when dry, cement them together so as to form a tray.

Now, that which I desire to know is this:—What should be the proportion of benzole to the gutta percha; how to proceed to coat evenly the solution on the cardboard without forming little holes which would absorb the liquid put into the dish; and, finally, how to cement the different parts of the tray together?

Perhaps some of your readers will be able to give me this information. B. A. I.

PORTABLE DARK TENT.

Sir,—I send a description of a dark tent, which is contained in a box A, 2 feet 6 inches long, and 1 foot 3 inches wide, and 3 inches deep, of which, when open, the lid B forms a back, C being a light frame hinged on to B, which falls back when shut, as shown by the dotted lines (fig. 2).

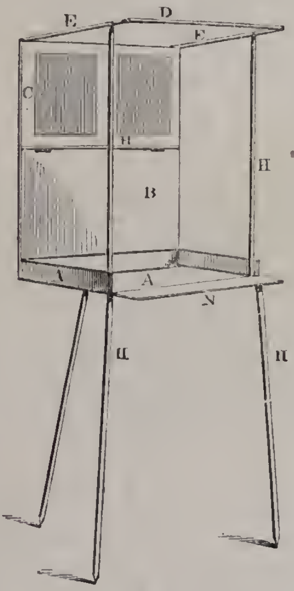

Fig. 1.

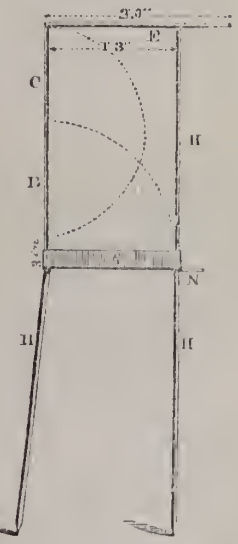

Fig. 2.

H H are two uprights in three pieces each, and socketed together like fishing-rods, and slip through sockets fixed to the sides of the box inside, to form front legs to the table and to support the two laths E E, which turn in pins at the top of the frame C, and catch on the top of the uprights H H by pins (fig. 3). The front side N drops down to increase the size of the table. C is a loose lath catching on the ends of the laths E E to support the front of the curtain. The whole is covered with one thickness of yellow and one of black calico, nailed on to the edges and back of the box, and hanging down loose in front to form a place to stand in, as in fig. 4.

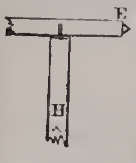

Fig. 3.

By undoing the tops of the legs in front, the backs may be doubled and the covering folded up, and all, including the legs (of which the back one S fits in a socket at the back of the case, and is also jointed), may be easily packed in a case and conveyed to the place chosen by the artist to photograph his view. I trust it may meet his approval, and may act properly for positives, and may never be adopted for taking wet negatives so long as there are dry processes which equal wet in point of beauty, and excel them in point of trouble, as requiring half as much apparatus.

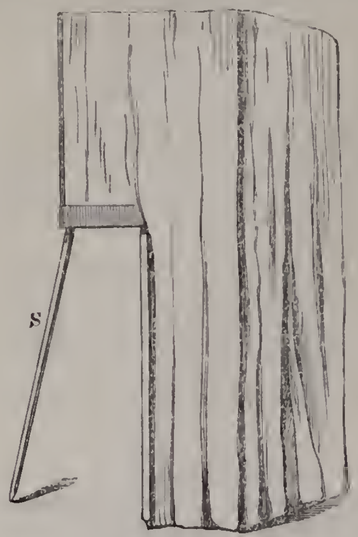

Fig. 4.

C. T. H.

ANSWERS TO MINOR QUERIES.

Test for the Purity of Chloride of Gold.—*Chemicus.* Your sample of chloride of gold is evidently much adulterated, and from your description we suspect the impurity to be chloride of sodium. Chloride of gold being a very expensive salt is one of those which is most frequently adulterated. Test it in the following way:—Weigh out with great accuracy a few grains of the dry salt, place it in a porcelain capsule and heat it, gradually raising the temperature to dull redness. Metallic gold will be left behind, and this being weighed should amount to 64 per cent. of the whole quantity of chloride taken. Chloride of sodium, however, being fixed at the above temperature will remain behind, and the residue must, therefore, be moistened with water and gently heated. The solution should not leave any residue when evaporated to dryness on a piece of platinum foil, and should not precipitate nitrate of silver. If a residue be left or a precipitate be found, it shows the presence of an impurity.

Alkalinity of the Nitrate Bath.—*A Tyro.* The alkaline condition of the nitrate bath is not due to the presence of free soda or ammonia in it, but *oxide of silver*, which is soluble to a slight extent in pure water, and much more so in solutions containing ammoniacal salts. As the collodion which you use contains iodide of ammonium, each time a plate is dipped into the bath a certain quantity of nitrate of ammonia is formed by double decomposition with the nitrate of silver, and thus in time the bath becomes charged with this salt. The oxide of silver has been gradually produced by the action of the small quantity of free ammonia which you have added to the collodion to give it "keeping properties." As a remedy, add 10 drops of strong nitric acid to half an ounce of water, and acid this by a few drops at a time to the bath; carefully testing it between each addition with delicate test paper, and stopping when an acid reaction just begins to be apparent.

TO CORRESPONDENTS.

*** *We are happy to inform our readers that a series of articles will be commenced in an early number on a subject of the greatest interest and importance to all engaged in the practice of photography, or other branches of experimental science, be they old or young, amateur or professional.*

A Jersey Amateur.—You may, with perfect safety, excite 4 dozen more plates in your bath without further replenishment. After then, you had better add about 5 grains of nitrate of silver to each ounce of the bath. A 40 grain bath should last for a long time with an occasional addition of nitrate of silver. We are glad to hear such good accounts of your success with the alabastrine process, which we gave at vol. i. p. 180.

J. S. O.—Some plans for cleaning old daguerreotypes have appeared in recent numbers; we recommend you to try these, as they will do no harm even if they are not successful.

W. W.—Received. We will see about the report mentioned.

J. B.—1. We do not think that the negative of your stereograms will fetch a high price in the market. The print is very good, and the subject pleasing, but similar pictures are now very numerous. You had better apply to some large dealer. 2. It should be four or five feet in focal length, and the reflector (good looking-glass) should be inclosed on all sides but those necessary for the passage of the light.

J. Bentall.—The information you ask has been given so continually in our back numbers, that we must refer you to those for an answer. State a particular difficulty which you have met with, and we will do our best to help you; but we cannot search through our numbers in order to refer an inquirer to the best bath, the best developer, the best printing process, or the best toning process.

T. S. H.—We decidedly prefer the maker "No. 1," although higher in price than most of the others. If expense be disregarded, you should have separate lenses for each sized picture; but if you require only one lens, it should be a large sized one, as, by increasing the distance between the camera and sitter, you will be enabled to take with it a small picture, whilst with a small lens you cannot take a large picture.

W. Sturgeon.—The Beaufoy's acetic acid recommended is of about one third the strength of glacial acetic acid; consequently, you must add ½ a drachm of glacial acid and 1 drachm of water in order to make your developing solution equal to the one containing 1½ drachm of Beaufoy's acid.

F. P.—We do not recommend you to attempt to make your own pyroxyline or collodion. It is too troublesome and difficult a job for a lady to undertake, unless it is an absolute necessity. It will be far better for you to purchase it ready made of some respectable maker; as an amateur cannot expect to prepare such a substance on the small scale, equal to that prepared in large quantities by experienced chemists.

F. L. G.—The fact of our having recommended its addition, should be a sufficient answer to your question.

T. A.—We have carefully read over our correspondent's letters, but we are compelled to say that the facts and experiments which he adduces in support of his theory do not really bear upon the subject. *A ray of light* might traverse space, but, unless received direct into the eye, we should have no evidence of its presence until it fell upon some body capable of arresting and reflecting it. Our correspondent is in error in assuming that as we ascend higher in the atmosphere the heat of the sun becomes less powerful. Professor Piazzi Smyth, in his interesting work, "Teneriffe," has shown that the contrary is the case. The fact of ice existing at the summits of high mountains does not prove that the suns rays have less heat, but that the radiation of heat is greater.

An Amateur.—We fear that you will not succeed in removing the varnish from your negative sufficiently perfectly to allow of your intensifying it by redevelopment. Chloroform would be the best solvent to try, and the plate should be well rinsed in successive portions of fresh solvent.

W. S.—1. If all the vessels are properly cleaned out to start with, and the distillation proceed not too rapidly, the distilled water, prepared as recommended at vol. ii. p. 23, should be quite pure. 2. Sel d'or is a double hyposulphite of gold and soda. 3. We think you will obtain better tones and superior transparent pictures by printing them by the albumen process. 4. You must not use a *stop* for your lenses, as you thus lose the advantage of their rapidity.

Clara W.—The most generally useful will be the Aplanatic.

W. L. C.—1. A drop of water is considered to weigh a grain; consequently, in formulæ, drops and grains are given indiscriminately. It would, however, be preferable if some uniform system of weights and measures could be adopted generally by photographers. 2. Place a few grains of iodine scattered about in a shallow dish, and lay the plate on it face downwards about an inch from the iodine. Keep the plate thus for three or four minutes. 3. The plates, when quite dry, may be preserved sensitive for several days. 4. Only a minute or so. Make a saturated solution of gallic acid. 5. The proportions are correctly given. You may, of course, make any quantity of the solution you like, if the same relative proportions are adhered to. 6. We think the albumen process will answer the purpose very well for stereoscopic transparencies. Perhaps your sulphuric acid was not strong enough; instead of diluting with water, add more acid, trying the result between each addition. 7. Yes; ½ a drachm to 10 ounces of water.

W. S.—Received.

A Sussex Photographer.—We hope soon to receive further information on the subject. We think *parts* of acetic acid are meant.

W. A. D.—If the diaphragm is not placed at the proper distance from the lens, you will lose the good effect of the large size of the lens.

F. A. D.—You have too much water in the collodion; arising, most likely, from your having used washed ether.

J. T . . . . n.—No practical process has yet been discovered by which a positive by transmitted light can be taken by an operation in the camera.

A Novice.—According to Mr. Hardwich, the addition of glycyrrhizine to the collodion does not tend to deteriorate the bath with which the collodion is used.

A. M.—Your cyanide of potassium is very impure.

O. X. Y.—Received with thanks.

Erratum.—Vol. ii. p. 155. In the formula for the toning bath, *bichromate* of soda is put for *bicarbonate* of soda.

Communications declined, with thanks:—M. G.—Stereo.—An Old Card.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—F. L. P.—P. P. L.—Amateur.—B. Paper.—W. R. O. X.—Zeno.

In Type:—Magnum Bonum.—C. T. H.—R. M. S.—Warrengal.—M. M. D.—W. L. Scott.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 41.—*June* 17, 1859.

THE "LUYNES" PRIZE.

In the present number is concluded the report of the committee appointed by the French Photographic Society to adjudicate on the claims of the respective competitors for the prize offered by the Duke de Luynes for the discovery of a good method of printing photographs in carbon. The great importance of the subject to which it refers, as well as the desire to mark our sense of the liberality of the Duke de Luynes, by giving it all possible publicity in this country, induced us to give it without abridgment, to the exclusion of other matter of, possibly, greater present interest; but as the length to which it extends may have prevented some of our readers from giving the necessary time for its perusal, we will embody the principal points of interest it contains, in the following article:—

The fact that photographs taken within the last few years had faded completely away, having come to the knowledge of the Duke de Luynes, he, with the view of preventing the art from falling into disrepute, placed a sum of £80 in the hands of the council of the French Photographic Society, with a request that they would award it as a prize to the discoverer of a method of printing photographs in carbon. This prize gave the required stimulus, and several French photographers commenced a series of experiments with the object of discovering the desired process. Chief among these were M. Testud de Beauregard, and MM. Salmon and Garnier; the former of whom, by the description he gave of his process, appears to us to have been the first to give the idea of the method now practised in this country and in America, and, it must be admitted, with greater success than he himself has been able to obtain. Strangely enough, though this gentleman has exhibited very promising pictures obtained by the means he described, his attempts to produce them in the presence of the committee were wholly unsuccessful. The next claimants for the prize, who were called before the committee, were MM. Garnier and Salmon, who have long worked together. These went through the whole of the manipulations in the presence of the judges. Over and above the difference in the ingredients used by them and Mr. Pouncey, there is this material difference in the manner in which the carbon is applied to the print; they spread the carbon on the paper *after* insolation, and to this circumstance we are disposed to attribute the imperfections in their process which the committee point out: want of half-tone, want of clearness in the whites, and a proper rendering of the distances. As Mr. Pouncey was not present, the committee, in a spirit of fairness and impartiality which does them great credit, determined to relax the rule that had been laid down for regulating their proceedings, and instead of insisting that he should come to Paris to operate before them as MM. Salmon and Garnier had done, they decided on testing his process by operating themselves in the manner described by him; and in order that no undue advantage should be given to the Frenchmen from the fact that they had produced their pictures themselves, the committee resolved to produce a print by each process, and decide on the respective merits of the two processes from the prints thus obtained; in this way the competitors were placed on precisely the same footing. The result of these comparative experiments was, that the judges came to the conclusion that, in an artistic point of view, the merits of the two processes were equal; that the manipulations in the Pouncey process were rather simpler, but the exposure required was four times greater than in the Salmon and Garnier process; in other respects, the advantages and the disadvantages of the two processes were balanced.

A great part of the report is occupied in discussing—discussing is hardly the word—in pointing out the merits of M. Poitevin. It was M. Poitevin who, in August, 1855, suggested the use of a mixture of bichromate of potash, organic matter, and a colouring substance, applied to the surface of the paper in one operation; and who, six months later, modified this process by dividing the single operation into two parts, applying the mixture of bichromate of potash and the organic substance before insolation, and the colouring matter afterwards. It certainly would be difficult to point out any real difference between these two methods of M. Poitevin and those previously described; and we think the committee are quite justified in assuming that they are nothing but modifications of the same process. At the same time it should be borne in mind that each of them may have derived his process from an experimentalist who employed bichromate of potash and organic matter in photography years before 1855; this gentleman, we need scarcely inform Englishmen, is Mr. H. Fox Talbot. We were somewhat surprised, on reading the report, to find that in reviewing the past of photography no mention was made of the services rendered to the art by this gentleman; not that we attribute this to any desire on the part of the committee to exalt the reputation of their own countryman by omitting all mention of Mr. Talbot's labours and discoveries, but from their being themselves unacquainted with them in reference to the subject under consideration.

It should be borne in mind that M. Poitevin was not a competitor for the prize; he himself had made no claim; hence it was that the committee constituted themselves his advocates. Had he come forward in opposition to MM. Salmon and Garnier, and Pouncey, it is difficult to see how the judges could have avoided giving him the entire prize, as there cannot be the shadow of a doubt that he published his discovery nearly three years before either of them. The motive suggested by the committee for his not coming forward is that he is desirous of bringing the whole force of his merits to bear on the competition to be decided next year; but they, taking his merits into present consideration, and fearing that some other person may make so decided a step in advance by next June as to carry off the whole of the prize, and so deprive him of all reward in return for his labours, resolved on awarding him a portion of the prize which the donor had given them permission to divide in any way they thought advisable.

The next claimants on their attention were MM. Davanne and Girard. The labours of these gentlemen are familiar to the readers of this journal, but they are not yet completed. As far as they have gone they have exhausted the subject; the careful minuteness of their experiments is evident to all who read their papers; we feel that their statements are reliable and their opinions are formed after mature consideration and examination of facts, and are not mere theoretical speculations; it is, therefore, with sincere pleasure that we see them placed in the foremost rank of those to whom prizes were awarded, and we should have been even better satisfied if they had been placed considerably in advance of the others. We conceive that there can be no comparison between the value of their labours and those of either of the other competitors.

The advantages to be derived from the discovery of these methods of printing in carbon—if that can be called a discovery which in its chief feature has been known for years past—are problematical; hitherto the advantage has been decidedly in favour of silver-printing, and we certainly do not feel disposed ourselves to abandon it in favour of any of the carbon processes yet published, and such appears to be the opinion of nearly every photographer. Therefore the researches of MM. Davanne and Girard are of the highest importance in every point of view. It is not necessary that we should go into them in detail, as they will be found in the report, but we will enumerate one or two of the more important facts to be derived from their researches. In the first place, the inference that may be drawn from their experiments as regards the permanency of silver prints is, that provided they are taken with proper care and precautions, they are unalterable; and that foremost among the precautions to be taken is the use of salts of gold as toning agents. They also pointed out the effect of the nature of the size in the paper on the colour of the print, the necessity of the presence of free nitrate of silver in order to obtain a print of a rich tone, and the identity of effect produced by this substance, whether fused or crystalline, the apparent difference being caused by its acid or neutral condition, and not by the physical condition of the particles; the deteriorating effect on the silver bath of animal charcoal, unless this substance had been previously most carefully purified by being washed and calcined, not merely washed, as that does not remove the whole of the hydrochloric acid. Moreover, they gave great attention to the chemical changes in the substances employed in the production of prints, and the conclusion at which they have arrived is that the chloride of silver is reduced to a metallic condition by the action of the light, the liberated chlorine attacking the free nitrate, converting it into a chloride, which is in its turn reduced to a metallic state, the particles of silver being attracted to those previously formed, and the again liberated chlorine attacking a fresh quantity of nitrate, until the whole of this substance is reduced. Objections have been taken to this theory of the manner in which the proof is formed, but we attach no particular weight to them. We know that chlorine has a great affinity for silver, which it converts into a chloride, and we also know that the affinity of the chlorine may be overcome by the effect of solar radiation, and, as a natural consequence, the silver is isolated and resumes its original metallic condition. The very simplicity of this theory is a great argument for its correctness, as we almost invariably find in chemical experiments that modifications which at first sight appear very complicated become exceedingly simple when thoroughly understood. Hence we are disposed to accept MM. Davanne and Girard's theory without hesitation, the suggestions that have been put forward in opposition merely complicating that which is in itself a perfectly intelligible explanation.

It must be a source of great gratification to every photographer that the result of these systematic and severe tests to which silver prints have been subjected has been the establishment of the fact that these prints do not necessarily alter because they are silver prints, but because of some impurity in the chemicals employed, or want of sufficient care on the part of the manipulator. Indeed, this might have been assumed from the number of old silver prints known to exist in this country; but we could not feel sure that the assumption was correct with the knowledge that such a large proportion of prints have faded from sight and memory; as those who are very sanguine on the subject of carbon printing maintain that those which have resisted the effects of time are rare exceptions to a general rule.

We need not say that we duly appreciate the importance of obtaining a really good method of printing in carbon, because, in spite of the improvements that have been made of late years in photographic printing, we could not help feeling a greater degree of confidence in the permanency of a substance which we can see still existing on paper on which it was impressed hundreds of years ago, than in the use of a substance which, however strongly our reason may persuade us is equally permanent, has not stood a similar test. At the same time, we by no means advocate the abandonment of the silver process until it is proved that the carbon process is capable of producing a picture of equal beauty, which it most certainly has not done yet. It is for those who have, by anticipation as it were, reaped the reward of a discovery which they can scarcely be said to have made, to prove their title to the reward they have received by giving to the world a perfected process which shall succeed as invariably as that now in ordinary use, instead of one which appears to fail in the hands of nine-tenths of those who have tried it.

In conclusion, we feel it to be due to the Duke de Luynes to express our acknowledgments, and that of photographers generally, of the liberal manner in which he has come forward to advance the progress of photography; and though his desire to see a really good carbon process has not been gratified, yet sufficient has been done to show that it can be made available for the reproduction of a limited number of subjects, and he has supplied a stimulant which may lead to more valuable results in the future.

THE TRANSMISSION OF HEAT THROUGH GASES.

BY PROFESSOR TYNDAL, F.R.S.

On Friday evening, June 10th, Professor Tyndal gave a most interesting lecture on the above subject, at the Royal Institution. His Royal Highness the Prince Consort occupied the chair. The lecturer commenced by stating that the results which he intended to bring before the meeting that evening were quite new, and as the experimental illustrations were of a very refined and delicate character, he must ask the indulgence of the meeting in case of any of them failing; for not unfrequently experiments which had perfectly succeeded in the laboratory were unsuccessful at the lecture table. He commenced by referring to certain subtle phenomena of vibrating media: for instance, if a bow were drawn across a tuning fork it was well known that the resulting sound was occasioned by the vibration of the metal throwing the atmosphere into a corresponding state, the waves of which were transmitted to the ear, where, by means which might never be fully understood by us, they produced the sensation of sound. Now, it was the belief of men of deep thought that there existed a strict parallelism between the phenomena of sound and of light—that luminous bodies gave rise to similar vibrations which, being transmitted between the source of light and the eye, produced the effect of vision. The medium in the case of light was considered to be a certain ethereal fluid, pervading all bodies and extending into the stellar spaces. The sun was the great fountain of light for our system. The light from this body came to us in an infinity of beams, in waves of various length, and being passed through a prism these beams were each deflected from a straight line to a different direction, according to their wave-length, and thus gave rise to the solar spectrum. (The electric light was used to illustrate this as being the nearest approach to solar light yet known, the brilliant light caused by the current of a 40-cell Grove's battery passing between separated charcoal points was thrown through a prism, and thence on to a white screen, when the brilliant spectrum of the electric light burst into view.) The lecturer proceeded to state that each of the brilliant colours there seen was occasioned by a vibration of this ethereal medium of a certain length; the blue colour was the result of more rapid vibrations, and might be compared to a shrill sound or high note in music, whilst the red was occasioned by a slower vibration, similar to a deep, grave tone on an organ. And as there existed atmospheric vibrations which would be either too shrill or too grave to be heard, so there existed vibrations of the luminiferous ether, which were either too short or too long to be seen by the eye. The former existing beyond the blue rays, and constituting the most refrangible part of the spectrum, were known to exist by their remarkable power of determining certain chemical decompositions, and were the rays principally active in the art of photography, whilst the latter or longer vibrations existed, as Sir J. Herschel had first shown, beyond the red rays, and gave rise to the sensation of heat. There existed also a test for these obscure heat rays in the thermo-electric pile of Melloni. (The lecturer here performed an experiment to illustrate this, by causing the obscure rays beyond the red end of the spectrum to fall upon a thermo-electric pile in connection with a delicate galvanometer, the deflection of the needle of which at once gave evidence of the existence of heat action.) This experiment proved also that there existed different kinds of heat analogous to the different varieties of colour, for these obscure heat rays were intercepted by several bodies, such as glass and water, which were perfectly opaque to them, whilst the luminous heat rays, the extreme red, would pass through these media. Rock salt was stated to be the only substance known which was perfectly transparent to all varieties of heat rays; and this was the reason why these obscure heat rays were invisible: the aqueous humours of the eye were perfectly opaque to them, and they could not, therefore, reach the optic nerve. This was experimentally demonstrated by interposing a glass cell filled with the crystalline humour of an ox's eye in the path of a ray of heat acting on a thermo-electric pile; the heat rays were shown to be entirely cut off. The lecturer stated that in the course of the lecture he would show that other bodies, perfectly transparent to light, exerted a similar absorptive action upon the rays of heat, and he had found that such as were rich in hydrogen were eminently opaque to these obscure heat rays.

Investigations on the transmission of heat through solids and liquids had already been made by Sir J. Herschel and by Melloni; but the only experiment yet made on the transmission of heat through gases was one by Pouillet, who made some observations on the power of the atmosphere to obstruct the heat rays of the sun, but, owing to the want of sufficient delicacy in his apparatus, with no very certain results. The lecturer then proceeded to state that he had undertaken to investigate this hitherto almost unknown domain of science, and by interrogating nature in other ways, and with more delicate appliances than had been done by Pouillet, he had already succeeded in obtaining some very extraordinary and unexpected results. An experiment was here made to show the absorption of heat by the atmosphere. A tube, about four feet long, closed at each end with a disc of rock salt, was connected with an air-pump; at one end was arranged a hot body, radiating obscure heat (an iron ball heated just to a point below redness), and at the other was placed a thermo-electric battery, in connection with a very delicate galvanometer. The current from a second thermo-electric battery was also conveyed to the galvanometer, and these two currents were caused to circulate round the needle, in opposite directions, through two independent coils of wire; and thus by equalising the intensity of the two currents, by varying the distance between the second thermo-electric pile and the source of heat, the needle of the galvanometer could be brought to the zero point, whilst the slightest preponderance of one current over the other would be immediately detected. This apparatus was arranged so that when the tube was filled with air the needle should stand at zero, when, by exhausting the air from it, the deflection of the needle immediately showed that more heat was then transmitted through the vacuum, and upon re-admitting the air into the tube again the needle returned to its former point. (This was an exceedingly delicate experiment; and in order to render the slight motion of the needle of the galvanometer sensible to the whole audience, it was strongly illuminated by the electric lamp, and a magnified image of the dial of the instrument was thrown upon a screen by means of a lens. In this way an almost imperceptible motion of the needle was rendered clearly visible.) By trying, in this very delicate manner, the effect of different gases upon obscure heat rays, the lecturer stated that he had discovered that *all* gases exerted an absorbent action upon these rays, and gases containing hydrogen in a prominent degree. This was illustrated by filling the tube with coal gas; in this case, the experiment tried in the manner described above, showed that this gas, although perfectly transparent to rays of light, was almost opaque to the dark heat rays.

Another experiment, similar to the above, was next tried; but with this difference, that the source of heat was not an iron ball radiating mere dark rays of heat, but a luminous body more nearly approaching the sun in character, viz., the Drummond, or oxyhydrogen lime light, which radiated *luminous* heat beams. Now Faraday had long since shown that the heat rays of the sun would pass through ice, and he had even fired gunpowder by concentrating the sun's rays on it by means of a lens of ice; and the experiment now tried showed that the luminous heat beams (the extreme red rays of the spectrum) passed freely through the same tube of coal gas, which had just been shown to be opaque to the dark heat rays.

The lecturer concluded by stating that some very important considerations arose from these experiments. It was seen that *obscure* rays of heat were intercepted and shivered to pieces by gases, but the *luminous heat* sent to us from the sun passed freely through these media. Thus the solar heat could pass uninterruptedly through the earth's atmosphere, but upon reaching the earth it was arrested, and became *obscure* heat. This kind of heat had just been shown to be incapable of transmission through the atmosphere, and therefore on radiation from the earth it was not sent back into space, but was at once stopped by the atmosphere, which was heated by it, and thus served to keep up the proper temperature of the globe. The atmosphere, acting in the same way as a ratchet wheel in mechanics, allowed the solar heat to come to the earth, and when there prevented it from radiating back again into space. It might, therefore, be imagined that the distant planet Neptune, if it had a tolerably dense atmosphere, would allow the solar rays to pass to the body of the planet, and when there prevent them from escaping, so that, in spite of its enormous distance from the sun, the temperature of Neptune might be such as to make it a tolerably comfortable place to live in.

A NEW METHOD OF DARKENING COLLODION NEGATIVES.*

BY DR. HENRY DRAPER.

Protochloride of palladium offers a very advantageous means of darkening collodion negatives.

The substance is easily made by dissolving thin portions of palladium in nitro-muriatic acid. The action goes on very promptly, forming a dark, reddish-brown solution. This is to be evaporated to dryness, taking care that the heat does not rise too high, so as to decompose the resulting chloride, but that it is continued long enough to remove the acid. The brownish residue, protochloride of palladium, is soluble in water, and in that state is fit for photographic use.

If we take a collodion picture in the moistened state which it presents when fixed with cyanide of potassium or hyposulphite of soda, and pour upon it a portion of this brown solution, a change very quickly takes place, the picture gradually darkening, and assuming degrees of blackness corresponding to its own shadows and lights, which therefore remain relatively unchanged. In those points where the effect has gone on to a maximum, a velvety blackness is assumed altogether impervious to the light.

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* Read at the last meeting of the American Photographic Society.

It is immaterial whether the picture has been a positive or a negative, the effect is the same, though less in the former than in the latter case. It is almost immaterial whether it now be viewed by transmitted or reflected light; in both cases its various shades present a black appearance.

In the application of the protochloride to such a picture, it may be observed that if the solution is strong the full effect is reached almost in a moment. Prolonged exposure is needless, and indeed gives rise to no further effect. The excess of the solution may be poured off from one corner of the plate, and so used over and over again till exhausted. As it becomes weak, the action goes on more slowly, and the operator should observe the precaution of examining the glass from the other side, to be certain, from its blackening, that the changes have prevaded the film through and through.

As I have said, the most advantageous time for employing the palladium is, perhaps, just after the picture has been fixed. It may, however, be used at almost any other stage. Indeed, pictures that have been made for a long time may, in like manner, be blackened after previously moistening them in water, though this operation is perhaps less satisfactory.

The operator will find no difficulty whatever in this application of the protochloride of palladium. There is no risk that it will leave unpleasant stains or marks on the plate. In its action it is not only certain but clean; indeed, he may perhaps be disposed to believe that in the transparent parts it exerts a good effect in cleaning off any trace of fogging that may hang about them. This, however, is probably only in appearance, through the other portions becoming so intensely black. The quantity of solution consumed is quite insignificant, as many drops only being wanted as are necessary to flow over the surface of the plate when it is inclined from side to side.

The following simple experiment will illustrate the advantages arising from the use of this substance:—Having prepared a collodion film in the usual way, I exposed it to the light of an Argand lamp, at a distance of four inches in the camera slide, uncovering it by half an inch at a time, at successive periods of 4, 2, and 1 minute, and 10 and 5 seconds. The stains in the collodion being developed in the usual way, I darkened one half of each of them by chloride of palladium, leaving the other half untouched. On printing from this plate, it was found that the stain blackened by the chloride, and which had been exposed for 5 seconds to the lamp, was as effectual as the unblackened one which had been exposed to the lamp for 80 seconds. It may therefore be inferred that the opacity of pictures is increased 16 times by the use of proto-chloride of palladium.

It moreover exerts a good effect by increasing the adhesion to the glass, so that a picture which has been treated in this manner, will bear much rougher usage than one which has not, and which remains unvarnished.

PHOTOGRAPHY AT THE SEAT OF WAR.

. . . . . Nadar has been sent for to head-quarters for a particular mission; and perhaps at the present moment photography, represented by him, floats in a balloon over the field of battle, for the purpose of depicting the manœuvres of the enemy. Thus the bold attempt made by him some months since in the hippodrome, which was ridiculed at the time by certain strong-minded parties, has been, possibly, applied to an indisputably useful purpose, which may result in its author reaping a reward at which we shall greatly rejoice. At the same time, other of Nièpce's disciples are taking photographs of greater or less interest, and, thanks to these, we can follow the triumphal progress of our troops. We cannot say whether or not the generals and superior officers who died so gloriously in the combats at Montebello, Palestra, or in the great battle of Magenta had their portraits taken previously; but we know that most of the subaltern officers figure largely in the collections of portraits which have been made. It is the fashion to have one's portrait taken in camp. The Turcos are especially and unexpectedly fond of submitting to the operation. One of them wished to be represented in the act of seizing an Austrian prisoner whom he had managed to get hold of in the *mêlée*, and was overjoyed when the photographer handed him the desired picture. A Zouave waited on Disdéri the evening previous to the fight at Palestra, and addressed him thus:—"Friend, perhaps to-morrow it may be my turn to mount guard in another world; but, previously, I should like to send my portrait to my birthplace." "Nothing can be more easy, my fine fellow," replied the artist; "we will operate directly, and the portrait will be ready for you when you call to-morrow." The next day our Zouave returned, and the portrait was handed to him. He looked at it for some time, but appeared by no means over pleased with it. "Sapristi!" he exclaimed, "that is not like me now." "What is wanting?" asked Disdéri. "Nothing is wanting; on the contrary, there is too much," replied the Zouave. "How too much?" "No doubt of it, you have represented me with two hands!" "Well, and are they not admirably brought out?" "Yes, indeed, but just look here, I have only one now." He had had his hand taken off at the wrist.

A photographer writes to us, under date the 8th June. . . . . At Frecate two peasants stopped my mule as he was taking a run across the fields, with the whole of my apparatus. You should have seen the fright expressed in their faces at the sight of my camera, which they evidently supposed to be a gun of novel construction. Indeed, you may see the expression of their faces, for I was so amused by their attitude, that I took a picture of them there and then.

I shall bring back in my portfolio photographs of all kinds, and which would be useful to a painter of battle scenes; some of them are dated from the cemetery at Montebello. That which I could not depict was the emotion I felt in this asylum of the dead, where corpses lay above and below the ground—where the soldiers came from amidst the horrors of the fight to breathe their last on the graves. A mournful spectacle I assure you, and one which was only softened by the reflection that the cause for which they died was a just one. I am convinced, too, that the blessings of the Italian people must have alleviated their last agonies.

You cannot conceive the extent to which our troops are electrified by the enthusiastic reception they have met with. . . . . . . We are often requested to make double portraits consisting of one Zouave and a Sardinian rifleman—a great intimacy subsisting between these two corps. I met a good many well-known Parisians yesterday at Novara. Among them were M. Audigen, the correspondent of the *Patrie*, who was in company of M. Durand Brager, whose pencil rendered such valuable services in the Crimea. As regards photographers, I have only met Disdéri; but I know that they are all along the line. You may believe me, photography will do its duty here bravely. . . . .
—*La Lumière*.

LEATHER VARNISH FOR POSITIVE PRINTS.

BY WENTWORTH L. SCOTT, ESQ.

In your notice of the report of the "Commission on the Prize founded by the Duc de Luynes," I see a preservative process, by M. Blanquart Evrard, of Lille, which consists in the alternate application of gelatine and tannic acid, in solution, to the positive print, with the view of precipitating *insoluble leather* between the interstices of the cellulose.

I beg to say that I have prepared prints by this process for the last two years and a half, and regret that I have only a small and solitary specimen with me here, which, however, I inclose for your personal inspection. I had purposed to make known the process when three years had elapsed from the time of my first experiments. As it is, I will now give the *modus operandi* in full, for the benefit of your readers.

To one ounce of *Nelson's gelatine*, add a pint and half of cold distilled water, and allow them to digest for a few hours; then boil, in an enamelled saucepan, and clarify with white of egg in the usual way; strain through a cloth, and then filter through animal charcoal, in order that the liquid may be perfectly decolorised. I need scarcely mention, that this solution must be kept at from 90° to 120° Fahrenheit while in use, to prevent gelatinisation on the surface of the print.

A number of finished and *dry* photographs may now be immersed in the above for five or six minutes—air bubbles being carefully avoided as usual. At the end of that time they may be taken out, and pinned up to dry—if possible, in the sun, or before the fire. They should next be soaked, from ten to fifteen minutes, in a cold, aqueous solution of pure tannic acid, which should be dissolved in the proportion of 200 grains of the acid to each pint of water; this, before using, must also be decolorised. The prints must be impregnated with the two solutions several times alternately (carefully drying them after each immersion), according to the quality of the paper, and the surface it is thought desirable to obtain. *Commence* and *finish* with the *gelatine* solution; rinse carefully in tepid, soft water, and dry for the last time.

As the above solutions become coloured by use, they should be again passed through animal charcoal, and their strength recruited by the addition of fresh material: it will be found useful to note the specific gravity occasionally. When a *very high gloss* is required, both solutions (proportionately) may be made more concentrated; but care must be taken, or the deposit will, perhaps, be uneven or opaque. If a *greyish-white film* appears on the immersed print (from its not having been quite dried after previous immersions), at once remove it with a flat camel or badger-hair brush.

Photographs are much improved in appearance by this process, and their durability is indubitable. *Salted* paper prints are made to appear like *albumenised* ones of a very fine quality, thus bringing out more fully the details of the picture.

The small print inclosed was treated in the way just indicated more than twenty-seven months ago, as you will see by the date at the back. It was purposely *over-toned* in an *old* and *acid* hypo. bath, and was washed only for two hours; but the *sulphurisation* at *first* visible has not been augmented in the slightest degree since. As the solutions were not decolorised, the back of the print is slightly tinted.

The value of this process, for arresting the decay of unique or rare prints, will, I am sure, be readily acknowledged by the readers of the "Photographic News."

Misson, near Bawtry.

MR. SKAIFE'S LECTURE ON INSTANTANEOUS PHOTOGRAPHY.

A "morning lecture" on this subject has been recently delivered by Mr. Skaife in the gallery attached to Mr. Hogarth's print establishment in the Haymarket. Owing, we presume, to the unusual hour, and the high charge for admission, the lecture was not very largely attended. It is scarcely a desirable mode of procedure to deliver morning lectures on a subject so interesting as photography, unless, indeed, the lecturer is anxious to illustrate his subject by actual demonstration. There are various reasons to be urged against the practice, chiefly that prudent photographers can ill afford to lose some of the most precious hours of the day to attend lectures. Mr. Skaife's name is already associated with some very clever feats in this branch of the art; among which are the pictures which he has taken of an exploding shell. The object of the lecture was to demonstrate the great utility of instantaneous photography to travellers desirous of keeping pictorial remembrances of the places visited, and that while it facilitated the operation of taking views, it also offered great advantages in regard to portability—an object of great moment to the traveller. In the room there were many views which Mr. Skaife had taken first on small plates, and which he afterwards had magnified; so that a great number of small views might easily be taken and put into a small compass, which could be magnified at leisure. The lecture was interspersed with Mr. Skaife's personal experiences in obtaining views of steamers sailing, the election scenes at Greenwich, and the manner in which he had caught the cannon ball in its flight. He exhibited the pistol camera, by which he had obtained the results which he exhibited. During the delivery of his lecture Mr. Skaife illustrated the mode of taking these instantaneous views, and urged the importance of such an aid to military men, in obtaining views of fortifications, &c.

Dictionary of Photography.

Cyanide of Silver is obtained in the form of a white curdy precipitate by mixing a solution of nitrate of silver with an alkaline cyanide. It turns brown when exposed to the light, and is very readily decomposed by heat. Cyanide of silver dissolves readily in solution of cyanide of potassium, forming argento-cyanide of potassium; the same salt is also formed whenever iodide or chloride of silver are dissolved in cyanide of potassium. It is of some interest, inasmuch as it is always formed in the cyanide fixing solution used in photography (whence it may be obtained in crystals by evaporation), and is largely used in electro-plating—a current of electricity being passed through the solution, any metallic article fastened to the negative pole is soon coated with metallic silver.

Cyanide of Iodine.—A compound of equal equivalents of cyanogen and iodine, which seems to possess the property of giving great rapidity to photographic preparations. It is prepared by mixing in a mortar two parts of dry cyanide of mercury with one part of iodine, and gently heating the mixture in a retort; the iodide of cyanogen sublimes in beautiful white silky needles. Great care must be observed in manipulating with this body, as it is very poisonous. When a solution of iodine is decolorised by means of cyanide of potassium, a liquid is obtained containing both cyanide of iodine and iodide of potassium; this solution has been used by M. H. de Molard, both for the purpose of fixing positives, and of taking rapid negatives on paper.

Cyanotype.—A photographic process in which ferrocyanide of potassium and similar compounds are employed as sensitive agents. It was discovered by Sir J. Herschel, who has described many modifications of the process. None of these, however, are used at present, owing to the difficulty of obtaining satisfactory results.

Daguerreotype.—The name given to the original photographic process of M. Daguerre on silver tablets.

Dammar.—A gum which, like copal, is much used in making varnishes for collodion plates. It is transparent, either colourless or slightly tinted yellow, tasteless, and inodorous. It fuses readily, is partially soluble in alcohol, almost entirely so in ether, and perfectly soluble in oil of turpentine. A solution of 2 parts of this resin in 2½ parts of turpentine, makes an excellent varnish for prints, which is more transparent and durable than the ordinary mastic varnish, and less coloured.

Decant.—To pour off gently, as a liquid from a precipitate; or to pour from one vessel into another.

Decantation, Washing by.—This term is applied to a very useful method of washing precipitates. The supernatant liquid is poured off, and then the precipitate is stirred up with water, and allowed to settle a second time, when the water is poured off. This operation is repeated for two or three times, until the precipitate is considered to be sufficiently washed from the salts with which it was associated.

Decomposition.—The art of separating the constituent parts of a compound body or substance. Decomposition differs from mechanical division, as the latter effects no change in the properties of the body divided; whereas the parts decomposed have properties very different from those of the substance itself.

Deliquesce.—To melt gradually, and become liquid by attracting and absorbing moisture from the atmosphere.

Density.—Closeness of constituent parts, compactness. Density is opposed to rarity; and in chemistry the density of a body indicates the quantity of matter in a given bulk of it. If a body of equal bulk with another contains double the quantity of matter, it is of double the density.

Development.—The term applied to the act of bringing out the latent image in any of the photographic processes. The developing agents most frequently employed are gallic acid in the paper processes; pyrogallic acid and salts of protoxide of iron in the glass processes; and mercury in the daguerreotype process.

(To be continued.)

The Amateur Mechanic.

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If Pope's extremely narrow dictum "One science only can one genius fit," were true, a century or a century and a half ago, it is certainly not so now. Eminence in any science cannot possibly be attained without a large familiarity with all other sciences in any degree cognate to it. This is pre-eminently true of photography. In order to excel, the photographer must possess, not only a good knowledge of chemical, optical, and other allied sciences, and of the principles of art, but he must often possess some mechanical skill. To the experimentalist in any branch of science, a knowledge of the constructive arts is often useful; but in the pursuit of a science so young as photography—and presenting a field of experiment so comparatively untrodden—it becomes absolutely necessary. New appliances, fresh contrivances, modifications, and adaptations of existing articles are constantly required, and must be, at least in the first instance, contrived by the experimentalist himself.

To aid the tyro, we intend to give, under the head of "The Amateur Mechanic," a series of papers on constructive art, so far as it may be conducted by the aid of a few simple tools. We shall explain the use of such tools as are most frequently required, and are easily procured, and point out the various materials—their characteristics, capabilities, and modes of manipulation—which will be most generally used. We may safely assume at the outset that the majority of our readers possess some ingenuity, as we imagine that few persons "take up" and practise photography with any degree of ardour without some manipulatory skill. This skill will, however, in all cases be better for being rightly directed. There is a right and a wrong way of doing the most simple thing, and we shall endeavour to make plain and easy the right method. Even where the manipulation is so novel that the right mode is not determined, there is still a better and a worst method, and we trust our suggestions will point out the best.

As to the manufacture of apparatus, where good articles of recognised and approved form and material are readily procurable, we should by no means recommend home manufacture. Time, money, and patience will generally be saved by purchasing of the professional manufacturer. The cases where mechanical knowledge and skill are desirable are in the first place those to which we have already referred—the construction of new forms of apparatus for experimental purpose—the management of repairs in the operating room, which require attention on the instant—and to the travelling photographer, whose journey might otherwise be rendered entirely useless, the improvising some piece of apparatus quite unprocurable on the spot, out of some material readily procurable anywhere.

Our plan will embrace instructions for the simplest modes of working in metals, wood, glass, gutta percha, paper, leather, &c., &c. Whilst we shall from time to time suggest the application of the various materials to photographic purposes,* and illustrate these suggestions with suitable engravings, we shall not feel it necessary at all times to point out the direct bearing of manipulatory details on the production of known and existing apparatus; our object being to make the instructions as complete as possible, having equal reference to the construction of articles that may be required as to those already in use.

GUTTA PERCHA.

We shall commence our instructions by some remarks on the properties, uses, capabilities, and manipulation of gutta percha. Perhaps no substance is capable of such varied application to the mechanics of photography, and is at the same time so easily and efficiently worked, as gutta percha. Unfortunately for its fair fame the report has gone forth that it has not fulfilled all that was expected from it, and in the form of baths it has to a large extent become the *bête noire* of photographers; stains, streaks, fogging, and a variety of other evils which photography is heir to, have been attributed to that "horrid gutta percha" bath. That these charges are true is by no means so certain; in many cases there is no doubt that the evils have arisen in just such proportion as the baths were not made of gutta percha, but of something else under that name. The prevailing commercial vice of the age—the striving after mis-called cheapness, the production of articles low in price and worse in quality—has been illustrated nowhere more forcibly than in connection with photography; and amongst other articles gutta percha has been largely adulterated, and has consequently acquired a bad name. We see no reason to believe, however, that a nitrate of silver bath, made of pure gutta percha, ought to injure the contents at all. We have one now in use in which we have kept nitrate of silver solution for four years without the slightest injury of any kind. Next week we shall treat of the properties of gutta percha, its impurities, &c. We shall be glad to receive from any of our readers the results of their experience in this matter, as it is only for the examination and consideration of many facts that trustworthy conclusions can be obtained.

(To be continued.)

Correspondence.

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FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 14*th June*, 1859.

To the many useful and interesting applications of photography already practised, I may now add another lately realised by the well-known Parisian photographers, MM. Bisson Frères. They have applied photography to the *reproduction* of geographical maps under the following curious circumstances:—

The Austrian Council of War had published formerly a magnificent map of the Lombardo-Venetian States. This map was freely exposed for sale before the present war broke out, but its circulation has since been prohibited. M. André Goujon, however, a French editor of maps, happening to possess a copy of the one in question, confided it to MM. Bisson Frères to have it photographed, if possible.

The undertaking was a difficult one. In the first place, the large dimensions of the map obliged them to divide it into several smaller portions in order to copy it perfectly; and it was indispensable that each piece should be photographed in such a manner that it would correspond, and might be joined, to all the others. The result is that MM. Bisson have perfectly succeeded in their endeavour, and have produced, in a few days, by photography, a map which is an exact copy of the original, and which it would have required years of labour to have engraved.

Vicomte du Moncel has lately published a paper on a new system of lighting up stereoscopic pictures. According to the author, although the stereoscope procures us an illusion which is almost complete, especially with stereoscopic proofs on glass, we cannot, however, do otherwise than remark a certain monotony in the lights and shades, which certainly does not exist in nature. The skies, for instance, are generally as white as the fronts of houses or monuments illuminated by the sun; and in many cases the distances or backgrounds do not slope gradually on to the foreground. In a word, stereoscopic views show a want of light and airy perspective.

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* We may here remark that we shall be glad to receive and give effect to the suggestions of our friends of constructive genius, arranging such suggestions in this department under their proper heads.

To remedy these defects, M. du Moncel has imagined a very simple contrivance which may be applied to any stereoscope. When M. Duboscq, in perfecting the refracting stereoscope, conceived the idea of applying to it stereoscopic proofs on glass, seen by transparency, he endeavoured naturally enough to prevent the confusion which might arise from the presence of exterior objects placed behind these proofs. This was accomplished by making use of ground-glass. But the bad effect subsists, nevertheless, to a great extent. M. du Moncel proposes to do away with the ground-glass altogether, and to let the proofs be viewed by placing the stereoscope before a reflecting system composed of a cardboard screen, painted sky-blue, inclined at an angle of 45°, and in front of which is disposed a plate of silvered metal, about 8 centimètres wide. This plate is joined to the basis of the cardboard by a linen hinge, and must be placed horizontally, so as to receive the light of the sun or of a lamp.

By placing the stereoscope so that the light reflected from the metal traverses the luminous portions of the landscape, and that the distances, skies, dark portions, &c., correspond with the diffused light reflected from the cardboard, the subject represented is illuminated in an enchanting manner.

My distinguished friend, M. Babinet, member of the Institute, has just published the following curious facts in a paper entitled, " On the Blue Shadows of the 27th May, 1859 : "—

It is not uncommon that, in full sunshine, but more especially in the evening, shadows of terrestrial objects appear strongly tinted with blue. Generally, this colour has been, and is still, attributed to the blue reflection of the atmosphere. Buffon once said, " this blue colour of shadows is nothing more than the colour of the air itself." This explanation is, however, completely erroneous.

On the 27th of May last, for instance, the Parisian sky was visited by a white mist that showed not a trace of blue colour, and which allowed the solar rays to pass through it in such a manner, that an observer could look at the sun without paining his eyes. The blue colour of the shadows on the evening of the 27th was evidently a phenomenon of contrast. The sun sent through the mist an excess of red rays. Every one knows that the red and orange rays of the spectrum are those which penetrate most easily through media that are not perfectly transparent.

This is proved by a pretty little experiment made by the celebrated Fresnel (but never published) before the *Société Philomathique* of Paris:—Pure magnesia, of the most perfect white colour, was carefully mixed with water, so as to obtain a demi-transparent medium. When the light of a candle or gas lamp is viewed through the mixture, this light appears *red*. A few drops of milk, of a solution of dextrine, or of any other similar substance, produces the same effect as Fresnel's magnesia.

On account of the misty white sky of the 27th May last, the ground and houses of Paris were illuminated by a light, containing an excess of red and orange rays, and having, for complementary colour, the blue of the spectrum. It was natural enough, then, that blue should have been predominant in the shadows of the 27th May.

If any of your readers will look at the image of the moon reflected on the surface of the little pools of water in the streets of London, they will find this image will be of a *blue tint*, which will become more intense as the eye remains fixed on it. The reason is, that these little pools of stagnant water are illuminated by the gaslights, which radiate a considerable quantity of orange and red light. It is a phenomenon of contrast. If a piece of white paper be placed near a gaslight during the full moon, and a solid, opaque object be placed upon the paper so as to have its shadow projected by the white light of the moon towards the gaslight, this shadow will be of an intense orange-red, whilst that produced by the gaslight will be blue. Another experiment, imagined by M. Babinet, and which I have often repeated with success, and to the astonishment of lookers-on, tends still more to prove the correctness of his theory :—

A sheet of white paper is placed on a table near a window, and by means of a lighted taper the shadow of a cork is projected towards the window. At the same time a second shadow of this opaque body is produced by the daylight streaming in through the window, and is projected towards the taper. The first of these shadows is of the most beautiful sky-blue ; the second shows the complementary colour, viz., reddish-orange.

This experiment is rendered still more striking if, by means of coloured glasses, the two lights which produce the shadows are varied at the will of the experimenter. M. Rumford, whose brilliant experiments have been recorded in the Abbé Moigno's *Répertoire d'Optique Moderne*, used to make two holes in the shutter of his room, and by means of coloured glasses applied to these holes, he obtained shadows of opaque objects. These shadows were tinted with an infinite variety of colours " of descriptions the least expected and the most beautiful."

In order that the remarkable phenomenon of coloured shadows may manifest itself, two descriptions of light are necessary : the one which illuminates the ground on which the shadow is projected—the other, which causes the shadow. In these conditions only can the phenomenon of contrast take place. The two lights, supposing them to be composed, have generally a certain amount of colour which is possessed by both of them, and a certain amount which is proper to each. Now, the law which presides over the phenomenon of coloured shadows appears to be that the colour of any given shadow, produced in the above circumstances, results from the elimination of the tints common to both lights, and the preservation only of the differential tints. Thus, on the 27th of May, the light of the sky which illuminated the soil of Paris was greyish-white ; the sunlight which produced the shadows was reddish-orange. From greyish-white subtract reddish-orange, and what remains is blue, more or less mixed with green and violet. The shadows, as I have said, were blue.

M. Secchi, director of the Roman Observatory, a well-known and distinguished astronomer, and an excellent photographer, has lately invented a new meteorological instrument, which will probably create a complete revolution in the manner of taking meteorological observations.

It is called a *meteorograph*, to which denomination may be appended the word *universal!* By its means everything is noted down without any interference on the part of the observer. It is composed of a peculiar kind of barometer invented by M. Secchi, which notes down the ever-changing atmospheric pressure ; an anemograph, which gives at any moment the direction and intensity of the wind ; a thermograph, which notes down at each moment the temperature of the air ; an ombrograph, which takes note of every shower of rain.

Mechanics, electricity, and electro-magnetism have been all called into the field in order to construct this marvellous instrument, which is at present at work in the Observatory of the Roman College. It would be impossible to describe it thoroughly without figures ; but any of your readers who would like to follow the example of M. Secchi, will obtain, on demand, from this distinguished gentleman, a complete description of his new meteorological instruments, by addressing their letter thus :—à Monsieur, Monsieur le Rev. Père Secchi, directeur de l'Observatoire du Collège Romain, &c. &c. &c., à Rome (*viâ* Marseilles).

To the Editor of the " Photographic News."

Sir,—I avail myself of the services of a " medium " to address this letter to you on the subject of a grievous outrage to which I have been subjected in the person of my friend and pupil, Eusebius. That injured spirit is too profoundly affected by the reiterated attacks that have been made upon him to address you himself, but his complaints shall not be lost in the airy inhabitation in which we dwell for want of a friend to plead his cause, and through you to prevent a repetition of such disgraceful attacks on the peace of one so gentle. The object of the writer, who commenced the infliction of the grievance many months ago, appears to be the communication of an art unknown in our time, which you mortals term photography. His motive may be a good one, but, as my dear Eusebius declares, nobody asked him for the information—which, by the way, one who has recently arrived among us, and who seems to know something of the subject, says is all "bosh," a word not used in any of the languages with which I was acquainted when on earth, but which I conceive to mean worthless, or devoid of value. "Was it not bad enough," my pupil exclaimed, "to be pestered with details for which I cared not one jot, and which to me were utterly unintelligible; but why, oh, why did he insult me by first supposing that I was insane enough to follow his instructions, and then on the strength of that supposition, tell me—me, Eusebius—that he would reward me for my weakness with a 'penny *meersham* and four ounces of '*cuaster*'? The latter, I suppose, one of the filthy compounds he has been worrying me about so long." Verily I think my young friend has cause for complaint, and I, his master, also. Pray try and persuade your brother to cease persecuting him. He may object that my Eusebius is not he to whom his letters are addressed, but I know that there is no Eusebius on earth, and that not one has existed there since he who is now weeping beside me quitted it.—I am, Sir, THE GHOST OF ERASMUS.

Photographic Societies.

THE FRENCH PHOTOGRAPHIC SOCIETY.

REPORT OF THE COMMISSION ON THE PRIZE FOUNDED BY THE DUKE DE LUYNES.*

In 1856, Messrs. Davanne and Girard discussed the objections of Mr. Hardwich, confirming and corroborating their preceding experiments. As to their examination undertaken for the object of competing for the De Luynes prize, it embraced too many subjects for them to hope to be able to complete it in a year. Such as it is, however, it already includes results more than sufficient to give an idea of what the whole will be. It may be useful if we here give the principal new facts that they have discovered.

"The great influence of the amount and nature of the size in the paper on the vigour and colour of the proofs; an influence occasioned by a combination taking place between the silver and the size.

"The value of the free nitrate of silver in the formation and the quality of the proof, which is of more importance, so to speak, than that of the chloride of silver itself, inasmuch as a proof on chloride of silver alone remains pale and wan; while that with nitrate alone and size gives great vigour and contrast.

"The real origin of the spots which disfigure so many finished proofs. Indication of the means of preventing these spots.

"Examination and determination of the best proportions of soluble chloride and nitrate of silver.

"Demonstration of the results produced either by an excess, or by a deficiency of soluble chloride, and, reciprocally, by the deficiency or excess of the salt of silver.

"Statement of the phenomena relative to the preservation of sensitised papers, and especially of the important part the free nitrate of silver plays in this matter.

"Experimental demonstration of the action of impure reagents.

"The differences of tone which are accidentally obtained, have been proved by them to arise solely from the different reaction of the chloride employed; that, consequently, all the chlorides of alkaline metals will give the same tone if they are absolutely neutral, while the same chloride, being at one time acid, at another time alkaline, will give different tones.

"A similar rectification of an error as regards the nitrate of silver. In place of all the uncertainties and discussions on the different virtues of crystallised and fused nitrates of silver, they have established beyond dispute, that the diversity of the action of this salt is due, not to the physical condition of their particles, but to their acid or neutral state.

"The exact extent of the impoverishment of the silver bath, by papers of given dimensions, and of the influence of albuminous preparations on this impoverishment, whence the necessity of frequently strengthening the acid bath is rendered evident.

"Demonstration of the causes which ought to induce us to exclude animal charcoal from the silver bath. The extent to which it weakens the bath.

"Theory of the formation of the positive proof by insolation.

"That the re-action which at the first glance appears very simple, becomes, on the contrary, very complex, when we seek to analyse it.

"The experiment proves in fact:—

"1. That the chloride of silver is reduced by the light to a metallic state, and that, if it forms a sub-chloride, it is only during the transition state.

"2. That the chlorine which is liberated goes to form successive films of chloride of silver, by decomposing the excess of nitrate, and, in that way, assists in giving great intensity to the proof.

"3. That under the influence of the light, the free nitrate of silver combines with the size, and determines a more or less intense colouring; that the formation is thus due to three re-actions, each of which influences the ultimate result in a different manner, and hence it cannot be a matter of surprise that these results are so exceedingly variable, according as one or other of these re-actions predominates; it may be said that the chloride of silver gives the *design*, the nitrate of silver the *intensity* of the tones, and the combination of the nitrate and size *colour*."

Now, if we place ourselves in the strictly literal point of view of the programme (*étude complète*), the work of Messrs. Davanne and Girard would not answer the stated conditions unless it were finished, inasmuch as it ought to embrace, as in fact it will embrace and follow step by step, every phase of the operations incident to the attainment of a photographic positive.

But in considering, as it was our duty to do, the liberal spirit in which the programme was conceived, it will be admitted that the great and principal sections already published by the authors, from 1855 to the present day, evidently satisfy the above-mentioned conditions; and besides, we could use the same liberty in their case as was allowed to us in that of M. Poitevin.

Is it necessary for us, after this statement, to insist further on the claims of Messrs. Davanne and Girard? Assuredly not. Nor do we believe that as regards the general body of photographers in France, as well as abroad, any apology is necessary. We have the firm conviction that every photographer will approve of the justice we have rendered to our two colleagues.

To better assure this concert, however, we may be permitted to recall the scrupulous care and precaution with which they conducted these experiments. Not a step was made in advance until the preceding one was found to be fairly established. No mere theoretical statements were made by them, but every statement was carefully verified by practical tests. No labour or obstacle was sufficient to make them draw back; the most minute, and in some cases apparently trivial, experiments were made by them, so that not a link should be wanting in the chain of evidence by which they proved to you the truth of what they advanced. Indeed, we believe that the labours of Messrs Davanne and Girard are of a kind which cannot be too highly praised, and that it will be long before a more substantially useful work will be undertaken for the benefit of photographers, or one more deserving of their gratitude.

It remains for us to inform you of the partition of the rewards and the classification we have adopted. You will have successively gathered the names of Messrs. Garnier and Salmon, Pouncy, Poitevin, and Davanne and Girard, as having obtained our suffrages.

You will also recall to your recollection that the character of the rewards has changed: the new and more liberal arrangements of the Duke de Luynes having led to the adjournment for three years of the award of the 2,000 francs prize, to be assigned under the strict conditions of the programme, the only question remaining to be decided this year was the division between those entitled, of the sum of 2,000 francs placed at our disposal, in a shape implying both honour and profit. This fortunate modification of circumstances enabled us to follow the dictates inspired by a conscientious examination, and even to travel beyond the official list of candidates.

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* Concluded from vol. ii. p. 166.

Finally, it appeared to us proper to establish two classes—one for the new processes, and the other for studies applied to old processes—thus preserving the two categories provided for in the programme. In the first class were included Messrs. Poitevin, Salmon and Garnier, and Pouncy. The first place therein was assigned to M. Poitevin. To him alone incontestably belonged the priority of invention of the process brought forward. We could not, therefore, suffer this opportunity of especially honouring the labours of so able and modest a *savant* to escape us—one whose zeal for science, and what more closely concerns us, for photography, is indefatigable.

The processes applied by Messrs. Garnier and Salmon, and Pouncy, are identical in principle, and very nearly identical in the manipulatory details, with the Poitevin method. The only modification of any importance is that introduced by Messrs. Garnier and Salmon, which consists in spreading the carbon in powder *after* insolation. Moreover, the latter gracefully acknowledges having borrowed the remainder from M. Poitevin. We don't know how this matter may be as far as regards M. Pouncy.

In the second class, Messrs. Davanne and Girard figure alone.

To explain the motive for placing them on the same level as M. Poitevin, we need only refer to the summary we have given of their labours.

Our votes, which we are happy to say, remained unanimous throughout, are resumed in the following gifts:—

A gold medal of the value of 600 francs (£24), to M. Poitevin.

A silver medal of the value of 400 francs (£16), to Messrs. Garnier and Salmon.

A silver medal of the value of 400 francs (£16), to M. Pouncy.

A gold medal of the value of 600 francs (£24), to Messrs. Davanne and Girard.

It is with the conviction that we have decided equitably between each, with the most ardent desire to receive the general approbation, that we conclude this report.

May the next competition inaugurate the advent of printing by mechanical impression and carbon, and success crown at the same time the efforts of the seekers and the generous views of the Duke de Luynes! Finally, may all photographers by an increase of intelligent investigations, and by a loyal emulation to do well, preserve to the future the present method with its brilliant and variously coloured results, the loss of which would be a source of grief to true art, and which the memories of our youthful years will always endear to our sympathies.

South London Photographic Society.

This Society held its second meeting on the 9th inst., in the large room of the Walworth Literary and Scientific Institution. Mr. A. H. Wall in the chair.

It having been suggested by the Chairman that the more important business of confirming rules and electing officers should be deferred until the arrival of all the gentlemen expected to attend, the members passed some little time in examining the few objects of interest provided by some of the members.

Some stereoscopic pictures were exhibited as specimens of Fothergill's dry process, taken by Mr. F. Howard. These were very beautiful, chiefly remarkable for their extreme perfection of detail in both lights and shadows, and by being of a very pleasing tone.

A camera stand and dark slide were shown by Mr. W. Ackland, as a portion of an extremely portable and effective apparatus intended for a continental pleasure tour.

A portable tent, invented by Mr. Leake, was exhibited by that gentleman, as one of the cheapest, and, by no means the least effective, of such inventions. It is thus described:—The table or bottom of the tent is a shallow tray 30 inches in length, 18 inches in width, and 2½ inches in depth, made of "half-inch pine deal," strengthened by wooden blocks at the corners, containing a box for plates, and a gutta-percha tray, with pipe attached, to serve the purpose of a sink, and preserve the table dry and clean. This tray has a light lid, which also forms the top of the tent, the three sides of which are made of two thicknesses of black and one of yellow calico, nailed round the inside of the tray and outside edge of its lid. An aperture in the black calico admits light to the tent through the yellow; and iron rods, about 2 feet 5 inches in length, support the tops when it is up, and fall into the tray when it is not. Over the opening in front is suspended a curtain of the same description as the sides, which, being hooked into its place, and wrapped about the person of the operator, effectually excludes the creative and destructive agency of light during the process of our works of darkness. Mr. Leake stated that he had taken some hundreds of views, 12 × 10 in size, with this tent, which stood well against wind, and thoroughly answered his purpose. It was erected and packed with great ease and speed, and could be made, with fair profit to the manufacturer, for about a guinea. He used a smaller one than that exhibited for stereoscopic pictures. When packed, it formed a case 30 inches in length, and 18 wide; and, with the tripod stand (on which, when up, it is screwed), weighed about 14 pounds. It could be conveniently carried by a handle attached to its side.

The business of the evening being to confirm rules and elect officers, the Chairman read a set of laws drawn up by the Provisional Committee, which, with some few alterations, were adopted.

The following gentlemen were elected to serve as officers:—*President:* Rev. F. F. Statham. *Vice-President:* Mr. W. Ackland. *Treasurer:* F. Howard. *Hon. Secretary:* A. H. Wall. *Committee:* Messrs. Cotton, Clarke, Hervè, Hannaford, Leake, senr., and Leake, junr.

The meeting was adjourned at about half-past ten.

Miscellaneous.

Now-a-days the skill of the photographist may be confined to a very few of the many steps in the process of forming a photograph. The chemistry of the substance he deals in may be a sealed book to him, and, indeed, in general is. He can buy all his materials in the most admirable state of preparation, and all that is left to him to learn is how easily he can throw away, by the smallest carelessness, all the results of the experience, the patience, and the skill that have been expended on the preparations that he buys. Such a person little knows how many failures and how much perseverance have led to the production of the collodion he may waste like water, or the silver bath which he abuses because it does not yield him pictures, while, perhaps, he has himself, by one unperceived act of carelessness, upset that delicate balance in its ingredients—the adjustment of which is one of the greatest niceties in this most capricious and yet most precise of arts. But if he has himself gone into the details of his preparations in the only true artist's way, has worked at the manufacture of his own materials—if he has become familiar with the fine precautions to be taken with the strength and temperature of the acids, by the aid of which he manufactures his "pyroxyline," with the purity of the alcohol and ether in which he dissolves it; with the right adjustment of the proportions of these, on which, strange to say, he will find the sensitiveness of his pictures greatly to depend; or, again, if he has studied those subtle mysteries of the silver bath, which experience and keen observation alone can teach—then, and then only, can he be in a position to feel the true enjoyment of the photographist; and only then will he be able to appreciate the delight of triumph and success, the sort of excitement said to belong to the winner in those games or pursuits in which something of chance or luck is associated with and rendered available by considerable skill. His occasional failures he will then meekly bear; and may, perhaps, console himself, as we remember a Wiltshire tenant to have done, who, priding himself on his success in horse flesh, and having once made a bad bargain, looked on the ground with the remark, "Well, sir, at the best of time, they be casialty jokers, hosses be!"—*National Review.*

Mountains in the Moon.—By the aid of telescopes we discern irregularities in the surface of the moon, which can be no other than mountains and valleys, for this plain reason—that we see the shadows cast by the former in the exact proportion as to length which they ought to have when we take into account the inclinations of the sun's rays to that part of the moon's surface on which they stand. From micrometrical measurements of the lengths of the shadows of the more conspicuous mountains, Messrs. Baer and Maedler have given a list of heights for no less than 1,095 lunar mountains, among which occur all degrees of elevation, up to 22,823 British feet, or about 1,400 feet higher than Chimborazo, in the Andes. If Chimborazo were as high in proportion to the earth's diameter as a mountain in the moon, known by the name of Newton, is to the moon's diameter, its peak would be more than sixteen miles high. Arago calls to mind that, with a 6,000 fold magnifying power—which, nevertheless, could not be applied to the moon with proportionate results—the mountains upon the moon would appear to us just as Mont Blanc does to the naked eye when seen from the Lake of Geneva. We sometimes observe more than half the surface of the moon—the eastern and northern edges being more visible at one time, and the western or southern at another. By means of this libration, we are enabled to see the annular mountain, Malapert (which occasionally conceals the moon's south pole), the Arctic landscape round the crater of Gioja, and the large grey plane near Endymion, which conceals, in superficial extent, the *mare vaporum*. Three-sevenths of the moon are entirely concealed from our observation, and must always remain so, unless some new and unexpected disturbing causes come into play.—*Humboldt.*

Photographic Notes and Queries.

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THE DEVELOPMENT OF PHOTOGRAPHS IN DAYLIGHT.

Sir,—You were kind enough to insert in No. 33 of the "Photographic News," of the 21st of April last, some explanations of mine relative to the development of photographs in the open air, by Mr. Young, of Manchester. As some objections were taken at the time to the explanation I gave, I shall be glad if you will allow me to detail more at length the facts and experiments on which I based my opinion.

I conceive that the proof appears, in consequence of the developing solution, on contact with the nitrate of silver, setting the particles of silver at liberty, which immediately attach themselves to the parts acted upon by the light, and not in consequence of the developing solution containing the reduction, already begun, of the iodide of silver. I can say positively that neither gallic nor pyrogallic acids, nor sulphate of protoxide of iron are capable, if used alone, of developing an image on a film formed entirely of iodide of silver; if an image appears it is the result of a mixture of the iodide with a greater or less quantity of nitrate. Hence the function of the developing agent is not to convert an invisible sub-iodide into visible metallic silver. The negative is not designed by the reduction of a sub-iodide, but by a metallic deposit. To satisfy yourself on this point, it is only necessary to ascertain the quantity of silver contained in the sensitive film before and after the development of the proof; and you will find after the complete development of the image, and even after fixing, which process removes the whole of the iodide in excess, that there still remains a larger quantity of silver than there was of iodide of silver in the film before the development; the necessary inference is that a deposit has taken place, and that the appearance of the picture is due to the particles of silver arranging themselves on the sensitive film; first one molecule of silver is set free, and then others group themselves round it, precisely as in the case of crystals.

The question next arises—where does the first molecule of silver come from? The answer to this is—light has either determined the formation of a sub-iodide of silver or the reduction of a part of the iodide of silver to a metallic state. In either case the quantity of silver so modified is so exceedingly small that it escapes observation even under the microscope, but the reagents which develop the proof prove very clearly that a modification has taken place. There can be no doubt that we may safely admit the formation of a sub-iodide of silver by the luminous influence, and then the decomposition of the sub-iodide into metallic silver by means of the hyposulphite of soda or the developing agents; but the picture remains invisible without the addition of nitrate of silver. Therefore, since, as is generally admitted, the sub-iodide must necessarily be decomposed, why complicate the question by assuming the presence of this useless sub-iodide, the existence of which is more than doubtful, inasmuch as it has never been isolated, and no mention whatever is made of it in the works of the great Swedish chemist, when it is evident that in the case of both iodide and chloride, the prolonged action of the light gives metallic silver. It seems to me much simpler to say that a luminous action which has not been continued for a sufficient length of time gives only a small quantity of metallic silver. And, besides, it must be allowed that the sub-iodide of silver, or the intermediate substance assailable both before and after being dealt with by the hyposulphite of soda or warmed and diluted nitric acid, conducts itself with reagents precisely in the same way as metallic silver; hence it may be assumed that, having the same properties, it is the same substance. In the special case of Mr. Young's experiments, which require albumenised proofs, I am much more inclined to believe in a combination of silver and albumen.

To sum up the substance of this letter, which is already rather long, it appears to me simple, conformable to chemical reactions and the experience of photographers, to explain the production of the picture in the following manner. Light, in proportion to its intensity, sets a greater or less number of molecules at liberty, and these molecules form the primary nucleus of attraction. The developing agents bring out the picture only in proportion as, mixed with nitrate of silver, it can set fresh molecules at liberty in a greater number, which molecules arrange themselves round the principal nucleus, and cause the appearance of the picture with a rapidity which goes on continually increasing in proportion as the nucleus becomes more extended.—Accept, sir, the assurance of my distinguished consideration.

A. Davanne.

BLISTERS IN THE COLLODIO-ALBUMEN PROCESS.

Sir,—Having derived much useful information through the medium of your paper, I think I cannot better return my thanks than by laying before your readers a few remarks respecting my experience in some of the dry processes, which I consider as being generally more convenient than the wet.

As lately as the beginning of October last I began to take dry negatives, when I prepared a number of plates and started on a photographic tour of two or three days, visiting several places in Derbyshire.

Fothergill's process having just come out, and being strongly recommended for its simplicity and certainty, I gave it a trial, and so far succeeded as to get 12 plates out of 18, having only tried *one* before starting. The 12 were tolerably good negatives, of which the one of Rowsley Bridge is a sample (perhaps the best); of the other six, some were injured by light getting in at the box, one I exposed twice over by mistake, and one or two were under-exposed.

Having seen the success of our eminent photographer Mr. Woodward, I (in a rash moment, as I have at times since thought) aspired to do as much, and consequently commenced to study the collodio-albumen process, but was stopped by its inveterate enemy "the blisters," but I did not give up without having tried to solve the mystery, for so it proved. I went through it again in particular detail, first trying one thing and then another, till I should think I prepared at least ten dozen stereoscopic plates, out of which I succeeded in getting only five free from blisters, which I managed to get one day in preparing nine, the other four blistering, although I used the same chemicals and finished all together. It is now only a month ago since I got rid of them. I think it has nothing to do with the collodion, as some maintain, though I dare say some collodion may require longer drying than others. The way I set about this is, to let the plate be quite dry before pouring on the collodion, and then let it set well at least three quarters of a minute; this is an important thing, for the longer you let it set, the less time the plate takes in drying afterwards; immerse in bath and manipulate as usual. After pouring off the albumen let the plate dry, and put it in box, and keep it in a warm room, say a kitchen, four or five days; if you have let the collodion film set well, the plate will be in a fit state to excite, to prove which, just wet the tip of your finger and rub once or twice over the corner of plate; if the film dissolve and come off, it is not dry, but if it bear rubbing, it is hard enough, and you may safely excite; under any circumstances the film should be sufficiently hard to bear scratching with the nail.

Supposing the plates be required immediately, lay them on a clean dish, and put them in the oven not too hot; if the oven be too hot, the plate will crack, and have the appearance as though a lot of little hairs had been thrown all over it; leave them in for about half an hour, and then put them to the same test; they will always, on being immediately removed from the oven, appear very hard, but I found that on cooling they will soften again unless sufficiently baked. I have not done much since my conquest—for I look upon it in that light—having only made one tour to Lincoln, when I had the misfortune to get my case knocked down, and my dark box injured, and, on lifting it out, found the lid raised at one end quite an inch, and most of the plates injured; but, having lots of time to spare, I exposed two or three, which turned out better than I expected; the one of the South Porch being injured a little in one spot by light, which makes the light place on the print, and the east end view being not so sharp as would have been the case had no light got in.

The view of the little bridge at Clifton was taken on a Fothergill's plate on the 27th of last December—a bright day. The print is not such a good one as I should wish, being rather dirty; but I have not time to print another.

C. T. H.

APPLICATION OF PHOTOGRAPHY TO TYPE FOUNDING.

Sir,—I am by trade connected with type founding, and am also conversant with the art of electrotyping and its sister art photography.

Now, sir, I want to bring photography to bear upon letter founding, and beg to offer to your notice the following remarks, which I think will convey an idea of what is required in order to make it a valuable aid to the master type founder.

Doubtless, you are aware that the production of printing types is an affair of a rather complicated nature. First, the letter is cut in steel, and, of course, for each different sized letter of a series, a steel punch must be cut; this punch is then struck or impressed into a thick piece of copper, termed the matrix, from which thousands of the letter may be cast in type metal—the copper matrix being justified—technically so termed—and placed in a small steel mould, which a man uses for the purpose of casting types with.

I can produce, now, *from types*, matrices, without employing steel punches at all, simply by submerging the leaden type, with suitable connections, in a solution of sulphate of copper, &c.. and subjecting it to the action of a galvanic battery—depositing copper thereupon. This is simple enough, mere possession of types of the desired face or design being the chief concern, but often possession only of an impression, made by printing ink, is all that can be obtained, and here I conceive that photography might step in—the print be copied photographically, enlarged, equalled, or reduced in size, for types of various *bodies*, and an electrotype taken from it at once, or a mould be made with it, in which, or *on* which, copper could be deposited. Small engravings and coats of arms, cast by type founders, might be produced in a similar manner. The advantage of a process of this kind would be considerable to letter founders.

Now, sir, cannot letters or designs be copied by the camera, the ordinary negative collodion process being employed, the surface acted upon by light raised as much as possible by means of a suitable developer, the plate bearing the design, with connections, placed in a copper solution, and submitted to the action of a galvanic battery? The result would be a printing surface of copper. But for obtaining a copper matrix, available for type founding purposes, *a mould* must be taken *from the plate*, and this, being *a raised design*, the copper deposited upon it would, of course, in face, yield the sunk matrix required for the purpose of casting printing types. It is not absolutely necessary that the copper deposit be, *in depth*, more than about the 50th of an inch, but, of course, the deeper the better.

The only difficulty would appear to be getting the outlines of the letter very sharp, and the surface very flat, but this I should imagine conquerable.

In conclusion, sir, should you think proper to publish this letter, I shall feel proud of having directed attention to this application of the beautiful art of photography, and will inform you of the progress I hope to make in it, for the benefit of all whom it may concern.

Alfred Stockman.

[We do not think our correspondent will meet with much success in his endeavours to apply the art of photography, in the above manner, to the purposes of the type founder, as the deposit on the collodion plate is of too delicate a nature, and the thickness of the reduced silver is almost imperceptible. It is, however, very probable that Mr. Talbot's photoglyphic process might be found to answer the desired purpose, as in that process the design may be eaten into a plate of steel or copper to any desired depth.—Ed.]

DRY COLLODION PROCESS.

Sir,—As requested, I now give the information by letter. Having tried Fothergill's and other processes these last twelve months, and *occasionally* getting a *middling-good* picture, though I have never been able to work with certainty, I at last became dissatisfied, and this led me to try some experiments. The thought that suggested itself to me was, Why may I not add something to the collodion, so as to fill the pores instead of applying preservatives afterwards; thereby making it far less complicated, and, as a consequence, more certain? After trying numerous experiments, I found that shellac answered best, although I have no doubt that better things than this will be soon found, if the attention of the photographic world be directed to the subject.

Dissolve 1 drachm of good shellac in 1 ounce of alcohol, and filter, then add to every ounce of ordinary collodion 12 minims of the above solution; coat the plate, and immerse it in the nitrate bath as in the wet collodion process, and when the greasy appearance has entirely disappeared, wash it in 4 ounces of clear rain-water in a dish, until the greasy appearance has left it as before; empty this out, and pour in a fresh quantity, just sufficient to flow evenly over the plate (say 1 ounce), which must be moved about once or twice backwards and forwards, not more. This is done to remove all the free nitrate on the surface, allowing sufficient to remain in the pores. (The beauty of the process depends much on the washing; therefore great care is necessary, for if you wash the plate too much, you will get a very feeble negative, if any. But if the plate has the proper amount of washing, the resulting negative is beautiful.) Then pour this off, and stand the plate *lengthwards downwards* in a warm place to drain and dry, otherwise you will have the plate develop unequally, owing to the greater quantity of nitrate at the lower end of the plate.

The exposure and development are the same as in the Fothergill process. I think if the plate be immersed in the bath previous to developing, it will not only develop quicker, but get more half-tints. Fix with hypo. and well wash.

I have had great success with this process, but I must admit I have also had several failures, although the latter I think will soon be got over. We must all expect some failures, especially in a new process. I think if this be known, others may improve on it. At all events the suggestion will do no harm, "Why may not something be found to add to the collodion instead of applying preservatives afterwards?" Thos. Clark.

2, *Ordnance Terrace*, *Shooters' Hill.*

THE HONOURABLE MAJOR FITZMAURICE'S NEW LIGHT.

Sir,—I observe in your impression of the 3rd instant, a correspondent expresses a desire to be better informed as to Major Fitzmaurice's new light. I am happy to be in a position to state that I received a note from the honourable gentleman a few days ago, in reply to a series of queries on the subject, in which he says:—"I think you will be able to have all you desire in the shape of fine light at an economical price, by means of an apparatus of small cost and general simplicity. A company is about to work the thing out, and I will in a few days forward you a prospectus."

From the quiet, business-like manner in which the discovery is being developed, I would augur favourably of its ultimate success; and I would suggest patience to our enthusiastic brethren of the camera till it is made public.

Glasgow. William Cochran.

BLUE STAINS ON COLLODION POSITIVES.

Sir,—I have seen that some of your correspondents are troubled with a blue stain in patches upon the film of their positive portraits after fixation, not caused by the contact of the developing and fixing solutions from imperfect washing.

I was for a long while troubled with this annoyance, and have accidentally discovered the cause to be too much glacial acetic acid in the developer. The blue markings will not appear with all kinds of collodion and the same developer, but should they do so, a solution with less acid in it will be found a sure *remedy*. From the blue markings more frequently occurring when cheap collodion was used, I am led to infer, that it being made with methylated spirit has something to do with the matter, but as yet I cannot speak with certainty as to the *cause*. Anon.

THE LINSEED DRY PROCESS.

Sir,—Would you be kind enough, through the medium of your paper, to ask Mr. Hughes whether the linseed process will keep good for any length of time? Could a couple of dozen plates be prepared, stored away in a tin box, and photographs taken with them a month or two after they were prepared? What is about the exposure for stereoscopic pictures, and which of the two developers does he recommend? for, on referring to vol. i. of the "Photographic News," at the page he mentions, I find there are two recommended. Warrengal.

ANSWERS TO MINOR QUERIES.

Condensation of Vapour on the Lens.—*Magnum Bonum* has been trying the effect of heating the silver bath and plate previous to exposure in the camera, and is surprised to find that the resulting picture is very indistinct and apparently out of focus, although he had previously been taking excellent pictures, and has not touched the camera or lens. The reason of this is obvious; the lens being in the open air is of a lower temperature than the plate which has just come out of the warm silver bath, the moisture, therefore, has condensed on the hinder surface of the lens and obscured the image. This often happens when operating in the sun. Care should always be taken to warm the lens slightly and to wipe it carefully, and in the sun the inconvenience may be lessened by placing a white handkerchief over the camera, which will reflect the rays without warming the box.

Method of Focussing Accurately.—*X. P. R.* You will find the most satisfactory as well as the easiest method of adjusting your camera to the true focus to be the following:—Do not simply screw the lens (or back of the camera) in or out as the case may be, until the object seems most distinct, and then stop; in that way there is great difficulty in catching the exact moment at which to stop: but having arrived at what seems to be the sharpest point, keep on moving the lens inwards until the image commences to appear palpably indistinct again, then reverse the movement and screw the lens outwards, overshooting the mark again a little, as before. Repeat this two or three times, oscillating like a pendulum from one to the other side of the true focus, and at each time coming nearer to it, until, like a pendulum coming to rest, you at last stop at the exact focus. This may seem complicated to read and unnecessary in practice, but a trial will soon show that both time is saved and greater accuracy insured by thus hovering about the focal point for a few seconds and finally alighting upon it, than by carefully and cautiously moving direct to it and then stopping. In the latter case, you will be almost sure to stop short of the true point, whilst, by the former plan, performed as it should be, quickly and decidedly, less time will be occupied, and the exact focus will be obtained with absolute certainty.

TO CORRESPONDENTS.

*** TO ALL OF A MECHANICAL TURN OF MIND.—*In the present number of the* "Photographic News" *is commenced, under the head of* "The Amateur Mechanic," *an important series of articles on constructive art, so far as it may be managed by the aid of a penknife, glue-pot, hammer, and nails, &c.; and the various materials which are easily procured and most generally serviceable, such as gutta percha, wood, metal, glass, card-board, &c., will be fully pointed out and explained, together with their characteristics, capabilities, and modes of manipulation. Few young persons at the present day are without some employment for their leisure hours, requiring manipulatory skill. This skill will, however, in all cases be better for being rightly directed. There is a right and a wrong way of doing the most simple thing, and it will be the object of these articles to make plain and easy the right method. The series will be fully illustrated with engravings, and will form a complete guide to the constructive arts, alike useful to the photographic amateur and experimentalist in any of the physical sciences.*

H. Moore.—Your picture is not properly mounted, and thus it has a pseudoscopic effect when looked at in the stereoscope. It is, however, very good as far as the manipulation and photographic skill are concerned, and we shall be happy to do as our correspondent wishes. We shall be pleased to receive a description of the apparatus mentioned.

W. Higuley.—Several formulæ for negative collodion have been given in our former numbers. See vol. i. p. 201, for several; and also Mr. Mayall's paper in a recent number. Your other question we cannot answer, as it would involve recommending particular makers.

Trouble.—1. In taking a stereoscopic negative, from which you wish to print transparent copies on glass, for viewing in the ordinary way *without cutting*, you cannot work with two lenses simultaneously, but must take the *right* hand picture on the *left* end of the glass, and, *vice versâ*, the *left* hand picture on the *right* end of the glass. For this purpose the pictures must be taken one after the other, and, therefore, a single lens will answer the purpose as well as a pair of lenses. 2. A rather light back ground.

Asinus.—If we understand our correspondent's question rightly, no process is known by which direct positives may be taken in the camera by a paper process.

Going a-Head.—1. Add a drop of nitric acid to your bath. 2. If it changes colour on keeping when iodised, you had better purchase your collodion in two separate solutions, and mix it as required for use. 3. The more gloss there is on a stereoscopic print the better it is liked by the generality of buyers.

A Positive Operator.—Why not try it first? We cannot tell you how to remedy imaginary evils, which might never exist in practice.

R. Steward.—We have answered one query by post; the others we cannot at present answer.

W. B. H.—*Easingwold* is a sufficient address. See the British Postal Guide.

Hypo.—1. The proper tone for the sky in a good positive is a half tint. A perfectly white sky (*i. e.* whiter than any terrestrial object) is never seen in nature, and in an engraving or painting would look absurd. If, therefore, your pictures are good in other respects, we advise you to be satisfied with a slight transparency in the sky. Painting and touching out should never be resorted to, except to cure an accidental blemish. 2. It all depends upon the way the picture developes. The manipulation varies with nearly every picture, even in the hands of a skilful operator.

E. S.—Omitted by accident. It shall be inserted in our next list.

W. L. C.—1. We do not know of any preparation that could be applied to gutta percha, which would have the effect of allowing collodion to be placed in it for a short time, and yet prevent any mutual action taking place. 2. It will be unsafe to add acid to the hypo. bath in sufficient quantity to produce milkiness, if it be used for the printing process on paper. In the collodio-albumen process, however, it will produce no deleterious action, and in some cases may even be of great service. The want of intensity you complain of does not arise from that cause.

J. C.—M. D.—The matter complained of will not occur again. Instructions to this effect have been sent to our Belgian correspondent.

R. Y. S.—Your bath is quite spoilt, and nothing now remains for you to do than to precipitate the silver from it and make a fresh one.

H. Ward.—Consult the index of our first volume.

H. H. (Stamford).—Your picture is very good, and the address shall be inserted in our next list. We should not have space to insert a complete list each week.

P. Atherton.—Your bath seems made correctly, and from your description, we should rather be inclined to blame the collodion than anything else. A good negative takes about half a minute to develop properly, if the exposure be right and everything in good order; and the developing solution ought only to be slightly brown at the end of that time.

F. H. Walker.—We have received no stereograms from this correspondent.

H. O. L.—Pale yellow glass is not at all safe to glaze your window with. It should be deep orange coloured.

Communications declined, with thanks:—Argentum.—P. G.—E. C.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Fllen.—Z.—J. S.—W. D. B.—Chemicus.

In Type:—J. Walter.—Retleidus.—R. M. S.—M. M. D.—A. Whitham.—"Ponçon."

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 42.—*June* 24, 1859.

THE TENERIFFE ASTRONOMICAL EXPERIMENT OF 1856.

We have been favoured with a copy of the report on the above subject, addressed by Professor C. Piazzi Smyth to the Lords Commissioners of the Admiralty; and as it is one of the first authentic accounts of the important results arrived at by the above astronomer during that remarkable expedition, we gladly avail ourselves of the opportunity thus afforded of placing our readers in possession of some of the more interesting facts, with a knowledge of which science has thus been so enriched.

As our readers are doubtless aware, the object of this expedition was to ascertain how much astronomical observation can be benefited by eliminating the lower third or fourth part of the atmosphere. This idea belongs to Sir Isaac Newton, who stated in his "Opticks," "They (telescopes) cannot be so formed as to take away that confusion of rays which arises from the tremors of the atmosphere. The only remedy is a most serene and quiet air, such as may perhaps be found on the tops of the highest mountains above the grosser clouds." The possibility of carrying out this idea suggested itself many years ago to Professor Smyth, and in November, 1852, he proposed a scheme for realising Newton's idea through means of a summer expedition to the Peak of Teneriffe, where there appeared a hope that telescopes might be elevated more than 10,000 feet above the level of the sea, with greater facilities of every sort than on any other known mountain. Several times was this scheme proposed, but without success, until the Astronomer Royal brought the subject before the notice of the First Lord of the Admiralty, the Right Honourable Sir Charles Wood, who, in the spring of 1856, agreed to furnish the necessary funds (£500) in order that an expedition might at once proceed to Teneriffe and make trial of the capabilities of the mountain.

No sooner were the preliminaries decided upon, than notices of the intended expedition were sent to the principal learned societies and scientific men in England, asking them to suggest experiments in different branches of science which, under the novel conditions in which they could be tried, might be expected to increase our stock of scientific knowledge. The scheme was universally approved of, but so many additions were proposed to the work originally contemplated, that the materials and money which had been allotted to carry it out, would have been insufficient for the purpose. Owing, however, to the liberality of private gentlemen, a large quantity of valuable apparatus, in several branches of science, was placed at the disposal of the expedition, and R. Stephenson, Esq., M.P., lent his yacht "Titania," with a crew of sixteen men, for the voyage out and home, and during the whole period of the experiment.

The leading object of the experiment was, in the words of Professor Piazzi Smyth, "to ascertain how much astronomical observation can be benefited by raising telescopes high into the air, and so enabling an observer to look at the celestial bodies through a less depth of atmosphere than they could from any of the ordinary observatories, established as they are at or near the level of the sea.

"If we could rise high enough above the clouds, not only should we at once have clear, in place of cloudy skies—no mean advantage in itself, as enabling us to increase the number of observations—but their quality, a matter of far higher importance, would be advanced at the same time. For, in proportion as the atmosphere itself is overpassed, so are the irregularities in its action on rays of light passing through it; and these irregularities are precisely what form the chief bar to accuracy of instrumental measure, and to certainty of telescopic vision.

"On the other hand exist the drawbacks, that on a high mountain it may be difficult to drag up the largest class of telescope, and impossible to build a large observatory; and though the air be thin and transparent, it may be in such a state of motion as to be prejudicial to the steadiness of instruments; or, again, the mountain top may be always enveloped in a local cloud. The exact value of these objections was only to be found by actual trial; and that, if they should be overcome, a new gateway would be opened up in the paths of science, not astronomical only, but of many allied subjects, may be gathered from the very important mass of suggestions sent into the Admiralty by their several referees. They show, indeed, what might be expected from a good mountain station, well worked for a series of years, rather than what a preliminary experimental trial on a small scale would be able to accomplish in a few weeks."

It is not our intention to enter into the details of the astronomical and physical results obtained in this remarkable expedition—they would be out of place in a journal devoted more especially to one department of science; but, inasmuch as all branches of physical optics bear so close a relationship one to the other, and considering how vitally important to the photographic experimentalist are all questions bearing upon the phenomena of atmospheric absorption and interference, we cannot fail to find a vast amount of new facts and important observations which will be of paramount interest to the majority of our readers. It is on this account that we wish to draw attention to the work before us, and in the following review of its contents will place before our readers those observations and discoveries which more especially bear upon our own science.

Amongst the suggestions made, as noticed above, it was stated by Professor Airy that it was very desirable that Fraunhofer's spectral lines should be observed with various elevations of the sun, and in different parts of the sky, and should be compared with observations made at the bottom of the mountain.

Sir J. F. W. Herschel wrote that he considered "the opportunity a very valuable one for obtaining an extensive and normal series of comparative actinometric observations, made *simultaneously* (strictly so) on the summit of the mountain and at the level of the sea, with actinometers provided with interior thermometers (not mercurial); . . . . . the object being the determination of the proportion of the solar heat absorbed by the atmosphere between the two limits of altitude. Should circumstances permit, an intermediate station, about half way up the mountain, would afford valuable supplementary observations:—such observations, taken at the time of the sun being vertical, would be very precious; but the series should be extended to every altitude of the sun, down to the horizon.

"As Mr. Smyth is an expert photographer, he should be provided with an apparatus for obtaining photographic impressions of everything worthy of record, *inter alia* the great Dragon Tree of Orotava (supposed to be the oldest tree in the world), from several points of view.

"It would be most desirable also to procure thermographic representations of the solar spectrum, and to examine the 'fixed lines' of the luminous spectrum, with a view to ascertaining whether they, or any of them, originated in absorption of the earth's atmosphere."

Respecting the solar spectrum and the remarkable "fixed lines" with which it is crossed, each suggester seemed to consider an accurate investigation of these phenomena of great value. The President and Council of the Royal Society wrote in the following words:—"As some of the fixed lines of the spectrum appear to owe their existence to the absorption of light by the earth's atmosphere, it would be interesting to compare the lines seen at the mountain top station when the sun is low, with those seen about the middle of the day, and those again with the lines seen at a small elevation above the level of the sea: and it would add much to the interest of investigation if photographic impressions of the lines could be taken.

"Certain observations seem to show that the atmosphere is, to a certain extent, opaque with regard to the more refrangible of the solar rays, so that it seems likely that the spectrum would be found to be of greater extent on the more refrangible side on the top of a high mountain than below. This point could easily be decided by forming a pure spectrum with a quartz apparatus, and receiving it on a piece of glass coloured by uranium, or on some other substance possessing a similar property."

Before we allude to the physical observations which more particularly concern photographers, it may be interesting to notice the atmospheric peculiarities which were observed at different altitudes on the mountain. Wind did not prove much drawback, as, although, at about the level of the trade wind cloud the hills were swept by it with terrific force, above that height the wind decreased in strength until it reached a neutral station, at about the height chosen for the station. Fog and clouds were also of very little inconvenience, for although they existed below and appeared daily—dense, closely packed together, and rolling upon each other—they showed no tendency to rise higher than 4,500 feet. "A more important quality of the atmosphere was caused by dust-haze, which was ever more or less present, though, sometimes, in vastly greater quantities than at others. . . . . Where this dust-haze came from or went to we could never tell; but when present we could easily distinguish its banks, or strata, as they stretched away and condensed in perspective towards the horizon. There were often several strata, one above the other, and mutually separated by very clear and sharply-defined spaces of atmosphere. . . . . Being above much of this dust, though, perhaps, not the greater part of it, we were evidently better off than an observer at the level of the sea, when pointing to a zenith object; but for a horizontal one we were worse off, from often being *in*, and then looking through the whole plane of the stratum, and so experiencing the maximum of its light-stopping effect. Hence the occasional deterioration of sunrise and sunset were infinitely greater than anything that occurred at noon, and on some days, when the sky was perfectly free from cloud, and the sun had been distressingly hot and bright when high in the sky, yet it had almost become invisible before it set. It was seen, though made out with difficulty on such occasions, through a darkling yet luminous haze of dull lemon-yellow colour; but what it set behind, or when exactly it did set, there was no ascertaining. The next evening, perhaps, the atmospheric dust had removed, and the change in the sunset was magical. The orb radiated hot and shone bright up to the moment of going down — sometimes behind Palma, showing hills of rich dark purple; sometimes behind the rollers of the cloud sea, clearly visible to the extreme edge of the horizon. Then, too, in place of the uniform yellow colour of the dusky sunset, the most gorgeous scarlets, yellows, and blues took its place.

"To eliminate this dusky medium would be of the utmost importance to the further improvement of astronomical observation, and may be considered the greatest and most subtile difficulty which the observer has to deal with, and it is probably general over the world, as on the South African mountains, at heights of 5,600 feet, the phenomenon was almost as notable as at Guajara."

The astronomical observations are most interesting and important. The following peep at the moon makes one regret that lunar photography had not formed one of the objects of the mission. "At Guajara, with the Sheepshanks' telescope, there were many tempting opportunities of delineating parts of the moon's surface; but the small power of the telescope prevented such work being as good disposal of my time as many observations that equally claimed attention. Moreover, there was so remarkable a tendency of bright points of the lunar craters to form stellar disks and rings that I was additionally induced to defer anything in this line until the Pattinson equatorial, with the transparent glass reflector eye-piece, should be erected.

"This instrument was established at the Alta Vista, in September, but the last quarter, which was to have been the lunar observing period, was interfered with by the premature setting in of autumn. In the first quarter of that month we had several opportunities, but not many or good ones, as the moon was then very low in southern declination, and the land ridges rose high to the west of us.

"These few views, however, with magnifying powers from 160 to 560, made a most vivid impression on the minds of all at the station. There have been doubts expressed by some geologists as to whether the circular cavities in the moon are craters; had they enjoyed these opportunities at the Alta Vista they would have renounced such doubts, so many and so striking were the analogies between the craters of Teneriffe and those we saw in the moon. Among the most characteristic, perhaps, of the resemblances is the greater steepness of the inner over the outer wall of every cavity or ring-shaped mountain. Again, the precipitous ledges, and often the conchoidal bays and recesses of the inner wall, and the generally level floors of the cavities, with here and there a peak raised upon, or a little cup-shaped cavity established in them.

"But the telescope showed, over and above those well-known features, such an infinity of detail, that though I tried once or twice, I found it quite impossible to make a proper drawing of any notable part, in the contracted space of time between darkness and the moon going behind the lava ridge. Half a night would have been short time enough. In this department there is indeed an immensity to accomplish; the clear air of the peak would be most favourable; and the opportunity that the astronomer would have, probably for the first time in his life, for ascertaining the distinctive forms of terrestrial craters, from eight miles in diameter to 300 feet, would enable him to appreciate better the minute revelations of the telescope."

Some account of the remarkable appearances of Jupiter and Saturn, under a high magnifying power, are next given, and when speaking of the several drawings of these planets which the unexpected revelations of the telescope at these high altitudes had tempted him to make, the Professor proceeds with the following valuable remarks on the necessary imperfections of hand-drawing, and the superiority of photography in all cases where accurate delineation of form or detail is desirable. "A single drawing should not be looked on by itself as of importance in the present state of astronomy; for how can others than the artist prove the reality in nature of anything they may find in that one document when this alone is before them? A bad designer will often unconsciously give an erroneous figure, and, though intending to show, perhaps, the blurred outline he actually saw, may yet, by using a pen in place of a brush, represent the erroneous appearance as having all perfect definition, and cause the juxtaposition of full white with deep black; and if he has put in these things, and a few others also, by slips or bad drawing, we must take the whole as he has given it implicitly or reject it entirely.

"If astronomical drawing is to take a similar trustworthy and trusted place to numerical observation in its own branch of subjects, we must, in the first place, with every man's work eliminate errors in drawing and imperfections of the means and medium employed. How easily much of this may often be accomplished by *two* drawings, may be well seen in some of the photographs in the book of illustrations, for having been taken with stereoscopic intentions, they are all double. Hence, is there some doubtful mark in one? we have only to look to the other; and if the mark was in the scene itself in nature, it will likewise appear in the second view as well; but not so if it were merely a fault or imperfection in the surface of the plate."

Several attempts were made at solar photography, but owing to the inconveniences consequent upon the temporary nature of all their arrangements, and the novel conditions under which the attempts were made, the results obtained in this way were not so satisfactory as other observations lead us to anticipate would be the case, if it were decided to erect, at any future time, a permanent observatory at this or any correspondingly high altitude. The following observations on this subject show some of the difficulties encountered in this important branch of celestial photography.

"All our observations of the sun laboured under the inconvenience of being performed in the open air, and freely exposed to the direct solar rays; to guard against these the observer's head and the eye-piece were enveloped in a black bag. When this was accomplished, then came the greatest difficulty of the excessive heating power of the sun, connected with its powerful radiation on a mountain. The eye-pieces became so hot that they could not be touched, and the black bag was continually getting burnt, and with its smoke irritating the observer's eye.

"Somewhat depending on these untoward accompaniments, which might be much relieved on a future occasion, the definition of the sun was invariably worse than that of every other object in the sky. The year 1856 was, however, so near the minimum of solar spots producing disturbance, that little of importance ever appeared on the disk. The only thing that I would particularise, is the 'silk marking' observed on September 13th.

"This was a feature almost defying any attempts to delineate by hand and eye, but should yield, one would think, to photography. Accordingly, with the assistance of the yacht carpenter, I improvised a photographic box to fasten on the end of the telescope, with a spring trigger, to make an instantaneous opening and closing of the aperture. But success was small, by reason of—1st, the wooden box being often heated to smoking; 2nd, the shaking of the telescope; and 3rd, the rapid vibrations of the air, causing bad definition.

"Making the best of these circumstances, definition was still unprocurable, until by a series of experiments, the very unexpected result was found that the chemical focus of the telescope was ·5 *inch longer* than the usual.

"This circumstance seems to settle the question that the rays which produce the photographic picture are by no means the luminous, and may or may not give us an idea of what we see with the eye. The black photographic effect of bright yellow is well known, and a similar diversity and more in point with regard to the possibility of obtaining good solar photographs was offered to me frequently in Teneriffe—chiefly in the lowlands, when taking photographic landscapes on collodion. It was this: a distant mountain range was seen, with the most perfect definition of innumerable details about its flanks; yet, in the photograph, nothing but the faint, though well defined, outline of the mountain appeared against the sky; as if, in place of the sun shining on the mountain, it were on the other side, and throwing the ridge into the shade. In a word, the aërial effect was intensely exaggerated in the chemical medium, with every increase of distance and illumination. Of the latter, a good instance was shown in the facility with which, at twilight, a good photographic image of the moon was obtained; while, by day, no matter how clear the moon shone out to the eye from the deep blue vault of heaven, no impression whatever could be procured.*

"After meeting with these indubitable instances of the distinction between actinic and optic images, no photograph would be admitted as a decisive evidence on a certain point suggested for inquiry by the Astronomical Society, viz., the brightness of the centre as compared with the borders of the sun. But whether forming the sun's image on a screen, or looking at it direct, there was never the slightest doubt on my mind or my eye as to the centre being very much brighter than the border. The centre was also whiter, the border being yellowish; and it was not at all from this cause that the borders were thought to radiate less light, for the difference was something far greater than variation of colour could explain. This experiment may be, perhaps, taken as conclusive. With the transparent reflector eye-piece of the Pattinson equatorial, the field of view having a stop, with a small perforation of about 3 in. diameter, I found that I could bear perfectly well to look at the border of the sun without any coloured glass; but I could not with impunity allow the stop to pass over the central regions of the solar orb, by reason of their surpassing brightness."

It seems almost superfluous to adduce the fact of the chemical focus of the telescope being half an inch longer than the ordinary focus, as a proof that it is not the luminous rays which produce the photographic picture, as there is, perhaps, no fact in optical science which is, and has been for many years, proved with more certainty than the non-identity of the visual and photogenic rays; and we are surprised to find so good a photographer and physicist as Professor Smyth expressing himself on this point, as if it were a new and hitherto unknown fact. We are quite of the opinion which he states, that a photographic result would not be admitted as decisive evidence on a question of the relative luminous intensities of two parts of the surface of the solar disc. Not only have our own experiments shown us that very great differences of actinic energy may be radiated by surfaces having little perceptible difference; but the laws governing the photographic impression on the sensitive tablet are apparently little in accordance with preconceived ideas on the subject. Setting aside, therefore, the anomalies introduced by the possible variations of colour on different parts of a surface, we can obtain in a photograph of the solar orb any desired difference of intensity between the central and marginal portions of the disc, the former being made to surpass, equal, or fall short of the latter in apparent intensity merely by a variation of the exposure and development. And as there is no means of ascertaining the normal length of time for the continuance of these actions, it is evident that inferences deduced from a photograph, to show any particular variation of luminous intensity, cannot fail to lead to erroneous conclusions.

(*To be continued.*)

PHOTOGRAPHY AT THE SEAT OF WAR.

[We have been favoured with the following interesting letter from the seat of war by a correspondent who left England for a continental tour shortly before the active commencement of hostilities.]

Casastroso, May 8.

Sir,—Having frequently seen, when in England, letters published in your paper written by photographers in foreign countries, it has occurred to me that you would be glad to receive a letter from a photographer at the seat of war, and I therefore avail myself of this day of rest to write you an account of what I have seen, and a little of what I have done, since I left England.

When I left England my intention was to make a tour with the camera in Switzerland, but the exciting prospect of being able to get plates of battle-fields, sieges, and other incidental scenes, induced me to change my course, and, instead of remaining among the glaciers and ice-peaks, to make a journey to the sunny plains of Italy. After mature consideration as to the best way of reaching the scene of action, I decided on purchasing a mule as being likely to be on the whole more economical than hiring one whenever I required its services, especially as there would be a great difficulty in finding such an animal at the seat of war. It took me nearly three days at Martigny to prepare myself for a photographic pilgrimage which I estimated would last three months, during which time there would be very little chance of my being able to remedy any omission I might make at starting. Straps had to be made and fastened on to cases, so as to allow of their being balanced across the mule's back in such a way as to leave me room to ride when I felt disposed, which I have not the heart to do very often, seeing how he is loaded.

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* Further still, it was found that the photographic plate feels and renders at once all those additional rays which in Stokes' spectrum the eye cannot perceive without the assistance of uranium glass.

I started from Martigny at the end of last month, passed the Great St. Bernard, and, on arriving at Aosta, stayed there for a day to rest. Here I met with an American and a German, both of whom were going to Ivrea, so we decided on travelling together to that place. I need not give you all the details of our journey there, as I did not unpack my apparatus anywhere for the purpose of taking a picture—not because I saw no scene worth taking, but because of the trouble it would involve. On arriving at Ivrea, I found the people in a state of great excitement. The Austrians had been beaten and driven back on two or three occasions by their troops, and they were sanguine that as soon as the French troops were in sufficient force, they and the Sardinians would drive the Austrians before them like a flock of sheep. I heard the most frightful rumours respecting the brutalities of the invaders, and it was not until I approached the district which they had occupied that I began to doubt the truth of these narratives, they were so circumstantially given. I expected to see the burning ruins of houses, fields laid waste, and villages abandoned by the men who had joined the army to revenge the outrages offered to their women, but I saw none of these things. I found the men going quietly to their work all day, and drinking much and talking loudly at the wineshops all the evening. I saw no despairing Lucretias—no smoking ruins, nor, I must add, many haystacks, or anything else in the way of forage. All the horrors I had heard on first entering Piedmont gradually dwindled away, until on reaching the actual place where they were said to have been committed, I could verify scarcely a single instance of violence having been offered by the Austrians, and I took some pains to ascertain the truth. I don't mean to say that no case like that stated with respect to the women took place, but I do say that I could not find anybody who could relate any instance of the kind from his own knowledge; and my inquiries were made at the places where all rumours arrive—viz., at the wineshops. Of the truth of one of the rumours I heard at Ivrea, further inquiry convinced me. I allude to the exactions inflicted on the farmers and tradespeople in districts occupied by the Austrians. The same man who replied to my question, with a laugh, if personal violence such as I have alluded to had been offered, burst into a fit of what I have reason to believe was cursing and swearing, when I asked if they had been robbed to any extent. On several occasions I was shown papers which purported to be receipts for hay, or corn, or tobacco, and signed with some undecipherable German name. Some of the holders seemed to entertain the idea that the Austrian government might pay them some day, but such credulity is not common. I conceive the only use of these receipts to be to prove that the holder supplied *munizione della bocca* to the enemy only in obedience to a requisition.

It took me some days to find out in which direction I could proceed with safety, as I had no desire to fall in with a body of Austrians, although I do not suppose they would have captured me, I being an Englishman and a photographer, which I presume would be a sufficient protection in any civilised country. I availed myself of this delay to prepare a few plates by the Taupenot and Fothergill process, both of which processes I had tried in Switzerland, with very similar results; in fact, the advantages and disadvantages of the two processes seem to me so equally balanced that I cannot decide which to adopt. Even as regarded exposure, which, as you are doubtless aware, is always longer at high altitudes in Switzerland than in England, I found that at one time the Taupenot had the advantage, and at another the Fothergill. I have not had an opportunity of printing from either of the plates yet, and, until I do so, I shall not form a decided opinion on either process. I do not intend to adopt the dry process as a rule, as I am afraid to trust to it in cases where no second attempt to take a negative could be made; moreover, it is too slow to be employed where the exposure must only occupy a short time. In reference to the length of exposure, there is one curious circumstance I must mention. I imagined from the purity of the atmosphere here, and the clear bright sun, that a shorter exposure would be sufficient than would be requisite in England, but I found the contrary to be the case. For example, I coated a plate with some collodion which I had brought with me from England, and with which I had obtained an excellent negative of a Martello tower on the heights near Folkestone, with an exposure of five seconds, although the day was not the most favourable possible, yet under the bright clear sun we have here, I was obliged to expose twelve seconds, and even then the negative was rather under exposed. This is a very important fact to be borne in mind, because, in default of knowing it, an important picture might be spoilt, and there might be no possibility of making a second attempt.

If I wished to obtain photographs of the people here, I should have no difficulty in obtaining sitters, and I think a photographic travelling van, such as you see in England sometimes, would not want for visitors in the more rural parts of this country. Not that either sex is at all remarkable for beauty, but plain looking people enjoy a peculiar faculty for self-admiration.

You cannot conceive what a singular sensation is caused by the consciousness that one is within a few miles of two armies who may at any moment fall upon and butcher each other, for a cause of which nineteen-twentieths of them are profoundly ignorant. The parrot-cry of the liberation of Italy—Italy for the Italians—which is so prevalent among the Italians themselves, is not at all understood by the mass of the French soldiery, if I may judge of the mass by the detachments that have passed through here. They have a vague idea that they are delivering, or are supposed by the Italians themselves to be delivering them, from a grinding tyranny, but they do not appear to have anything like a clear idea of its nature; but the motive which inspires them, and gives them the energy and lightheartedness which they exhibit, is the honour and glory of France, and, of course, Frenchmen. The Austrian soldiery have no such stimulant. They are told to march into a country the inhabitants of which never did them any harm, and to rob and plunder them, and they do it. They can have no desire to kill Sardinians and Frenchmen for the mere sake of compelling the Italians to live under the rule of the Emperor Francis Joseph, still less can they be desirous of shedding their own blood in such a cause. What a satire it is on human nature that the very men who, ten years ago, were in arms to obtain self-government for themselves, are now slaughtering others with the view of forcing upon them the very government which they then fought against. You at home have not a thorough conception of the horrors of warfare, or of the injustice and cruelty it involves. If a man among us chooses to consent to kill or be killed for a mess of pottage, we cannot prevent him, nor is there any great reason perhaps why we should; he voluntarily selects this method of getting his bread, and we are not unwilling that he should take the consequences; but with the people I am among, and, as you are aware, among all the nations of the continent, the case is totally different. A man may have the greatest horror of shedding blood, but if he is drawn in the conscription, he must serve. The very family in which I am at present living furnishes an instance of the hardship of such a system. There is an old man who is just able to walk behind a cow and a couple of goats to the field where they get a miserable subsistence from the roots of the grass which was cut and sent to Vercelli in obedience to a requisition of the Austrians; there is an old woman who is almost blind, but whose health is otherwise good, and whose appetite is only too keen considering the small quantity of food she can get; and lastly, there is a girl about thirteen—the child of their old age, and who is consequently deficient in both bodily and mental vigour, but possesses that astonishing likeness to her mother which we only observe in cases where the mother is already advanced in years when the child is born. Six months ago these old people were happy and contented. They had spent their lives in labour, and now that they were old they were supported by the produce of their little farm, cultivated by two strong and healthy sons; but the fatal conscription put an end to their happiness; their two sons were both drawn, and the remainder of the family were reduced from modest poverty to a condition of absolute starvation. My coming to live among them has improved their condition a little; for, though I am anything but a rich man, such provisions as are to be had about here are cheap, the Austrian occupation notwithstanding, and it is no great sacrifice to give up a few luxuries now and then when it is to give bread to a starving fellow-creature; but I don't like to think of what may happen to them when I leave, which I must do in the course of a day or two, as it cannot be long before an action will take place between the Austrians and the allies, and painful as it may be, I should not like to miss an opportunity of getting a photograph of a field of battle. In this desire I am not actuated by mere curiosity, though, no doubt, the novelty of exhibiting such a picture at home may have something to do with it, but I should like people to have an illustration before their eyes of what a battle-field is really like, when the excitement of the conflict is past; they might not then perhaps talk so flippantly of war; and endeavour to use their reason in such matters instead of being swayed by their feelings.

I will write you again when I have decided on my future movements. J. L.

THE PHOTOGRAPHIC SOCIETY.

The meetings of the Photographic Society have now terminated for the season, and a long vacation of five months will possibly supply the working members with some interesting matter for the winter session.

We do not estimate very highly the practical advantages to be derived from the discussions at these meetings. As a rule, they are desultory; and, if we are to accept the statement made by most of the principal speakers at the outset of their remarks—that they are made without previous consideration—it is not surprising that they should be so. At present a member is ignorant, until he arrives at the meeting, of the subject to be discussed, so that if anything novel be contained in the papers read, those present can only bring speculation to bear upon it, instead of the result of careful thought and actual experiment; and if these speculations should happen to be erroneous, no subsequent opportunity is offered for correcting them. We have been led to the consideration of this subject from the suggestions made by Mr. Hughes at the last meeting, to the effect that the Council should adopt some means of informing members of the subject to be discussed beforehand, so that they might be better prepared to take part in the discussion.

This suggestion is both practical and practicable. Formerly, when a paper of any importance was to be read at the ensuing meeting, a communication was made to those members of the Society, known to take a special interest in the subject, some days previously, and a proof of the paper transmitted with the communication; the consequence of this was that each of those members came down to the room prepared to point out objections to the theory or process advocated by the writer, and to support those objections by facts, instead of mere speculations.

It may be urged that photographers, whose opinions are of value, ought to have all the facts relating to photography so completely at their fingers' ends, as to be able to speak decidedly on any matter connected with the art without any necessity for previous thought, but such an idea is entirely erroneous.

In the first place, the paper, if it contains no new information—as in truth it very often does not—is not worth reading; and if it does, the remarks must, as a general rule, be mere theoretical speculations; and as these have not unfrequently been shown to be wrong, it has contributed to raise a prejudice against the scientific photographer, who is sneered at by the unscientific one, as not being a practical man; as if the scientific man, who devotes himself to laborious researches in the laboratory, were not pre-eminently a practical man, inasmuch as he employs no substance without making himself thoroughly acquainted with its properties beforehand, which is more than can be said of a vast number of photographers who pride themselves on being essentially practical. On several occasions, during the last few months, the papers read at the Society have contained so little that was useful or interesting that we have hesitated to report them, and, as this is extremely likely to occur again, we trust that greater facilities will be given by the council in future, to enable members to compensate for the want of interest in the papers by an increase of talent in their speeches. If there were any sort of difficulty in the way of accomplishing what Mr. Hughes suggested, or if it involved any great expenditure of the Society's funds we should hesitate to recommend its adoption, but this is not the case; all that is required is a small expenditure of labour and postage stamps, and surely we are not asking too much in desiring that the Secretary should give this information if he does nothing more. In the case of other scientific societies, in whose proceedings we are interested, this is done, and there can be no good reason why the same duty should not be performed by the officials of the Photographic Society.

NEW PRINTING PROCESS.

BY WENTWORTH L. SCOTT, ESQ.

Owing to the number of letters I have had upon the subject of my new printing process, described in vol. ii. p. 26 of the "Photographic News," I think it right to make a few explanatory observations, in accordance with the wishes of many of your readers.

First, the quantity of *starch* employed for the salting solution may vary with the texture of the paper used, and operators must be guided, in a great measure, by their own discretion on this point. Next, the addition of nitrate of lead to the silver bath is not *indispensable*, but it is highly desirable. After the print has been taken out of the pressure frame and soaked in water for a short time, the *brine*, in which it is then placed, should *not* be a saturated solution; and care must be taken that no solid particles of salt come in contact with the print, as they will cause spots and stains to appear during the *toning* process.

From the queries of correspondents, I find that my toning bath formula requires some little explanation. The *chloride of soda*, recommended to be used, is *not* the same as *chloride of sodium* or common salt; the former term—although chemically incorrect—is that which is usually applied to the substance in question. To my surprise, I read, that the *solution of chloride of soda* "cannot be had" in Glasgow and Carlisle. Let those, who find it difficult to procure, take a drachm (60 grains) of good commercial *chloride of lime*, or *bleaching powder;* dissolve it in hot water, and pour off the clear liquid, to which add slowly a solution of *carbonate of soda*, until it no longer produces a precipitate, or milkiness on dropping into the chloride; a tenth part of the filtered liquid may then be used for each pint of the toning bath.

It should be borne in mind that, although no more of the *chloride of gold* is required to tone prints by this, than by any other method, there *must be* a certain amount of the gold-salt in solution to act satisfactorily. It is, therefore, advisable, when the first vigorous action of the bath seems declining, to stir in a little dilute solution of the chloride of gold (first made *very slightly* alkaline by carbonate of soda) before immersing each batch of prints—the *quantity* to be regulated by the number and character of the photographs. Ordinarily, one grain of the perchloride will tone from 150 to 180 (or even more) square inches of landscape prints. This bath must be kept (chemically) dark, and particles of chloride of silver must be removed by filtration whenever observed. It should always retain a *faint* odour of the chloride of soda, a little of which may be added from time to time.

To avoid waste of material, no more of a photograph than is actually wanted should be placed in the toning bath—the edges, &c., being cut off on its removal from the frame.

Misson, near Bawtry.

Dictionary of Photography.

Dextrine, or British gum, is prepared from starch by heating it to a temperature of 320°, and retaining it at this point for an hour or two. It has now been converted into dextrine. Dextrine is solid and transparent, soluble in water and weak spirit, but insoluble in ether or strong alcohol. It derives its name from a peculiar property which it possesses of producing right-handed rotation upon a ray of polarised light. In solution, it may conveniently replace gum arabic in most cases; thus, it forms a very suitable cement for mounting positives. It is also used in addition to albumen in some of the preservative processes; but its employment in this manner requires care.

Diactinic.—A term applied to bodies which are transparent to the chemical or actinic rays of light, as is rock crystal. It is thus analogous to

Diaphanic, or transparent, which denotes a body having the power of freely transmitting rays of light, and

Diathermic, or transcalescent, a term proposed by M. Melloni to signify a substance which is transparent for heat, like rock salt.

Diaphragm.—Diaphragms are metallic discs, fitted to slide into a certain definite position with regard to the lens, and having circular holes in the centre varying in diameter from ⅛th of an inch to 2 inches or more for large lenses. Their use is to restrict the rays coming from the margin of the field of view, to the *margin* of the lens, and those from the centre of the field of view to the *centre* of the lens; whereby the spherical aberration is diminished, and the difference of focus for near and distant objects at the same time reduced. The above effects are greater with the diminution of the size of the aperture, but at the same time it must be remembered, that the light will be correspondingly reduced; consequently, there is a limit to the diminution of aperture, which cannot be exceeded without the disadvantage of slowness exceeding the advantages of diminished aberration and greater depth of focus. It will be as well for the operator to make himself acquainted with the sizes of apertures best suited for his lenses under the different circumstances in which they are likely to be used, always bearing this in mind, that the *larger* the aperture compatible with distinctness he is able to work with, the more artistic will be the resulting picture.

Dilute.—To weaken by an admixture of water, which renders the liquid less concentrated.

Diffraction.—When a ray of light passes near the edges of a body, it undergoes some remarkable changes. If the light be previously passed through a lens of about an inch in focus, so as to come to a focus, and thence diverge as from a point, the shadows of objects held in the diverging rays will be found to be surrounded with coloured fringes. These can be seen either by receiving them on a screen of white paper, or by examining them by means of an eye-piece. The phenomena of diffraction are among the most beautiful, but, at the same time, the most abstruse in the science of optics.

Diffusion.—A property which is possessed by all gases (and as Professor Graham has since shown by aqueous solutions and other liquids), by virtue of which, if they are left in contact with each other for a certain time, varying from a few hours to as many days, they will gradually mix together; even if the vessels containing them are merely connected together by a narrow glass tube, and the heaviest gas is placed lowest. Oxygen and hydrogen will thus diffuse into each other through a glass tube of more than a yard in length and a quarter of an inch in diameter against the action of gravity, although oxygen is sixteen times heavier than hydrogen.

Dipper.—The piece of glass, or other substance on which the iodised plate is laid, in order to be dipped into the nitrate of silver bath. Dippers are usually made of glass, but there are many reasons why this should not be used; amongst others, being the fragility of the material, and the great adhesion of the two flat and wet surfaces of the plate and dipper when taken out of the bath. A dipper of pure silver wire, as described in a recent number (vol. ii. p. 24), or one similar in shape, but made of iron or copper wire, thickly coated with pure gutta percha, is far preferable to one of glass. Several useful suggestions on this subject having recently appeared in our columns, we need only refer those who seek further information on this subject to our back numbers.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

Before speaking of the modes of manipulating, and the purposes to which the article may be applied in connection with photography, it may be important to notice some of its properties and its behaviour when submitted to different kinds of chemical action.

Gutta percha, as our readers are probably aware, is the gum, or concrete juice, of a tree, growing plentifully in the Malayan forests and in the islands of the Indian Archipelago. It exudes from the tree in the form of a milky fluid, and rapidly coagulates into a hard mass, which only requires mechanical purification to render it fit for the various purposes to which it is to be applied. The pure gutta percha of commerce is of a light reddish brown colour, but the colour of various samples apparently of equal purity will sometimes vary. We have before us at this moment two pieces, each of which have, we believe, been submitted to similar mechanical purification; one, a somewhat rare sample, is nearly white, or, perhaps, more properly of a greyish cream colour; the other is of a dark brown tint, scarcely distinguishable from the rosewood table on which it is laid. The lighter colour, however, would appear to approximate more nearly to absolute purity; as, on evaporating the filtrate from a solution of gutta percha in sulphide of carbon or chloroform, the gum thus purified is nearly white; the tinctorial matter filtered out is probably the result of chops of bark and other vegetable impurities falling into the sap when first collected. Time and exposure have also the effect of darkening the colour.

At ordinary temperatures, gutta percha is a hard, tough, inelastic substance, having a specific gravity of 0·999 at 68° Fahrenheit, different samples slightly varying, however, in this respect in proportion to their degrees of porosity. It is entirely impervious to water, is unaffected by frost, is a bad conductor of heat and electricity, is unaffected by alkalis, vegetable acids, and dilute mineral acids. According to Dr. M'Laghan, its elementary composition, which is nearly identical with that of caoutchouc, as given by Faraday, stands thus:—

Carbon	86·36
Hydrogen	12·15
Oxygen	1·49
	100

As we have remarked, it is not affected by dilute mineral acids; in a concentrated form, however, it is attacked. By the action of sulphuric acid, with one equivalent of water, it becomes disintegrated with evolution of sulphurous acid. According to M. Payen, in an able article on this substance, in the *Comptes Rendus*, by the action of a saturated solution of hydrochloric acid at 68°, it turns of a darker brown colour, and becomes brittle; this action is, however, it would seem, very slow, as we have seen a carboy which had been used for containing this acid in its commercial form for eight years. Monohydrated nitric acid attacks it violently with effervescence and fumes of hyponitric acid, leaving it red and pasty, and subsequently solid and friable. For vessels intended to contain hydro fluoric acid, it is of great importance, as in a moderately dilute form this acid has no action on gutta percha.

The most perfect solvent for gutta percha is sulphide of carbon, which readily dissolves it without heat. The offensive smell of this article is one objection to its use, and renders chloroform, which is scarcely inferior in solvent power, preferable to the amateur. To some extent when cold, and almost entirely by the aid of heat, it may be dissolved by means of benzol or camphene. Some difference in results seem to have been obtained in experiments with this article under the treatment of ether and alcohol. The usual effect observed is, that it is softened by the application of ether cold, partly dissolved by the aid of heat, but at once thrown down again on the addition of alcohol. Commercial spirits of wine, or even alcohol often sold as absolute, appear to have no effect upon it; but it is stated by Arppe that in absolutely anhydrous alcohol thirteen per cent. of gutta percha will be dissolved, and that it is quite soluble in ether entirely free from alcohol; he adds the curious fact, that if the gutta percha have been previously treated with alcohol it is insoluble in ether. These facts will, doubtless, be of interest to those of our readers who may have failed in obtaining an ethereal solution of gutta percha for experimenting with collodion.

The characteristic which gives to gutta percha its peculiar value in the hands of the amateur in constructive art, is the facility with which it can be rendered plastic, and the ease with which it may then be fashioned to suit almost any purpose. At all temperatures below 100° Fahrenheit, or a little more, it retains its firmness; at 118° it begins to soften, but still retains its toughness and consistency; at about 140° it becomes very ductile and plastic; from this heat to about 200° it is in the best condition for manipulating. Subjected to this heat, or indeed as high as 240°, it retains all its properties unaltered on cooling; but at 248° it melts, and on cooling remains in a semi-fluid adhesive mass, being in fact partly decomposed. At this, and greater heat, it may be incorporated with hypo-sulphites, metallic sulphurets, pigments, and bituminous matter, undergoing, in point of fact, the processes termed "vulcanising," which entirely alter its character, giving it great hardness, and at the same time making it unsuitable for most of the purposes to which it is applicable in connection with photography. Subjected to any heat not greater than 240°, it retains, as we have said, all its properties on cooling, during which process it contracts. This contractile tendency appears to continue to some extent for an indefinite period after cooling, a circumstance of which important advantage can be taken in the formation of joints of various kinds, in which a ligature or coating of gutta percha is applied, and by its continued contraction gives, necessarily, a gradually increased firmness. This contractile tendency should be borne in mind, and allowed for in manipulating, otherwise, in some cases, such as the fitting up of gutta percha tubing, &c., subsequent inconvenience might arise. The same tendency would seem to indicate unfitness for some purposes, such as stoppers, which would gradually become smaller than the orifice to be filled. Of the impurities of gutta percha we shall speak in our next article.

(*To be continued.*)

Jacques Balmat, the well-known Alpine guide, who has been quite a lion in a small way since he has been over here, has been presented with a photographic apparatus, &c., by his admirers, and has been duly instructed in its use.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 21*st June*, 1859.

The following remarks, which I publish here for the first time, will tend to show how photography may become of great service to analytic chemistry. The subject is completely new, and I regret that my numerous occupations will prevent me working it out for some time to come.

Some garnets were once brought to me, and I was begged to pronounce whether they were real stones or imitations; but I was not allowed to submit them to analysis, as they were such extremely fine specimens that the owner would not hear of one of them being destroyed. I arrived at the desired end, however, in the following manner:—Some garnets will scratch quartz, but not all; quartz will scratch easily any artificial garnet. By trying, therefore, the action of a piece of rock-crystal on the specimens alluded to, and then their action upon quartz, I was enabled to affirm that they were real stones.

I have often thought that photography might be applied with success to these sort of determinations. Chemical analysis is becoming more and more perfect every day; the balance, which is yet the basis of every operation, will become less and less used as our *optical* means of observation increase. Already, many difficult analytical investigations have been facilitated considerably by the use of graduated tubes and test liquids, whereby the quantity of any substance is known by noting the space occupied by the liquid, its colour or its transparency being likewise taken into account.

Biot, Bouchardat, Clerget, and others have applied *polarised light* to chemical analysis with great success.

Moigno has written a *brochure*, in which an apparatus of M. Soleil's invention is described; by means of this apparatus the amount of sugar in a solution may be obtained from the action of this substance upon polarised light; and it would be absurd to think that this method could not be applied to other substances besides sugar.

The researches of Melloni, Arago, &c., have shown us with precision the nature of the light that emanates from stars (suns), planets and their satellites, and comets. Arago, by means of his *polariscope*, has been able to distinguish light emanating from a solid from that which is radiated from a liquid or a gaseous body. We may hope, at some later period, to be made acquainted with the physical and chemical constitution of a planet, by means of the light alone which it reflects upon the earth. When we see the solar rays light up the full moon, and give to it the *same tint* that it gives to distant clouds or to far-off mountain-tops upon our own earth, may we not already assert that it is the *same matter* that is acted upon by the sunbeams in one case as in the other?

Photography will, sooner or later, come much to our aid in these respects. Already, as early as 1835, Professor Hessler, of Gratz, began this problem with considerable success. Let us suppose, for instance, that in order to perform some experiment, we have been furnished with a piece of glass, and that it is necessary for us to know whether it be flint-glass or crown-glass; moreover that, for various reasons, we cannot submit it to chemical analysis. If no other means, such as its specific gravity, colour, action upon the spectrum, &c., could be brought to our aid, it would be exceedingly convenient to know that to darken chloride of silver by light which passes through crown glass, it requires one minute and five seconds, and that to obtain the same effect with flint glass it will require two minutes and three seconds.

In 1835 Professor Hessler made some experiments which will doubtless become more interesting as chemistry, optical science, and photography progress. He found that *the action of the solar spectrum upon a paper covered with gum, on which some chloride of silver had been sprinkled, varies ac-*

cording to the substance of which the prism which produces the spectrum is made.

Not only does this action differ with respect to the *quantity* of chloride which is blackened in the experiment, but also as to the precise point of the spectrum at which this action is at its *maximum* for a prism of such or such a nature, and the *time* necessary to obtain the maximum.

The latter element (time), according to M. Hessler, is nul, or nearly so, for water and alcohol; it is from twelve to thirteen minutes for oil of turpentine and oil of cassia; two minutes three seconds for flint glass; one minute five seconds for crown glass.

The maximum of chemical effect was found for the spectrum produced by alcohol to reside in the violet ray in close proximity with the blue; for water, in the middle of the violet; for the oil of cassia, at 23 lines above the border of the violet.

It will be readily understood, from what precedes, that there is a method to be discovered by which different substances may be detected, one from another, by photographic means, *i.e.*, by the action that light exercises upon a photographic paper after having passed through the substances in question. It appears to me that this method would probably solve the difficult problem of detecting sophisticated oils, or of distinguishing readily one oil from another. It might become extremely valuable as a means of analysis in organic chemistry.

I received a visit from M. Nièpce de St. Victor yesterday. He has again plunged into a new series of experiments. Among the new facts he has just discovered concerning the "Action of Light" is the following, which the "Photographic News" will be the first to announce.

If a solution of starch, or dextrine, be submitted to the action of the light of the sun for a certain time (a quarter of an hour for very small quantities), it will be completely converted into glucose, or *grape-sugar*, and the solution will acquire a sweet taste, &c. N. Nièpce tells me he is quite sure of this for dextrine, and almost sure of it for starch. If confirmed, it will constitute one of the most interesting facts discovered by M. Nièpce. Your readers are aware that starch and dextrine are converted into sugar by the action of acids, of ferments, and of heat, but it was never before observed that light alone can produce the same effect. When, however, we reflect upon the influence of light on vegetation, and upon animal life, we wonder less, but we wonder still!

Nothing is more talked of in Paris, at the present moment, than a new system of ventilation and warming of public buildings invented by Dr. Van Hecke, a Belgian physician. The hospitals of Beanjon and Neckar in Paris, and the Asile Impériale of Vesinet in the environs, three of our finest edifices, upon which the government have already expended, but in vain, considerable sums for ventilation, &c., have been submitted to Dr. Van Hecke; the government commissioners having found that, in the course of six or seven years, all the money, formerly so usefully expended, will be regained, from the great economy of Dr. Van Hecke's system, which is, moreover, extremely simple. I remember having read, not long ago, in the *Times* and other papers, accounts of the disastrous effects of bad ventilation—or rather, want of ventilation in the English barracks and hospitals. I was struck with horror! and if the facts had been presented in any other than English papers, I should have felt bound to deny them. For this reason I call attention here to the very satisfactory results obtained in France, Belgium, and Holland, by Dr. Van Hecke. In Paris I have visited, by accident, hospitals ventilated by this gentleman. The effects were rather surprising: each person has, at least, 2,200 cubic feet of pure air at his disposal per hour; this air is warmed in winter and cooled in the heat of summer. The air of the wards filled with sick is as sweet and pure as the breeze of a corn-field, and all this without the slightest draught. The same may be added of other portions of the building we will not mention.

It has been found that a hospital which is not ventilated at all, is considerably more expensive to the government than the same hospital ventilated and warmed by Van Hecke's system. This curious fact is easily accounted for by the quantity of coal consumed in the former case. In one of the many interesting experiments that have been made at Paris, with a view of comparing this new system of ventilation with that of an older one, it was found that in the old system 2 pounds of coal would renew 3,500 cubic feet of air, whilst, in Dr. Van Hecke's experiments, 2 pounds of coal renewed 86,065 cubic feet of air.

MM. Blondel, Labroust, and Dr. Grassi, charged by the French government to examine M. Van Hecke's system, have written a most flattering report, which has been published. They remark, among other advantages it presents, that Van Hecke has succeeded in cooling the air during the heat of summer—"a process often promised, but never before realised in hospitals."

Your space will not permit me to describe the process, but I have called attention to the subject because I believe it to be a most important one; and I think, from what I have seen myself, that the man who introduces this new method of ventilating and warming public buildings into England, will render a service to that country which it would be difficult to repay.

I will add a few words on Van Hecke himself:—He is a short, stout, Dutch-built man, nearly, if not quite, on the wrong side of 50. He took a medical degree in the University of Ghent, while still very young, and went to reside in Brussels as a practitioner. But not liking medicine as a profession, he applied himself to the study of physics and ventilation, to which he has devoted his whole life. He succeeded, after many years of labour, in creating a system of ventilation which, for perfection, simplicity, and economy, has never been equalled. It is a sort of monomania with him; he talks of nothing else, and he has, perhaps, a right to be proud of it. He completely ruined himself and family by physical experiments connected with ventilation made at Brussels, and he arrived in Paris a year or two ago without a sou in the world.

The French, who have a keen eye for anything that is very advantageous to them, caught at Van Hecke's system of ventilation. An order from government arrived one morning at his modest lodgings, and his fortune and reputation were made for ever. He resides now in a nice little *château*, at Asnières on the Seine, and is overwhelmed with demands from Holland, Prussia, Poland, St. Petersburg, &c., besides a large amount of work in France. The Emperor has ordered him to ventilate the Palace of the Tuileries and the Hôtel de Ville.

Van Hecke has been heard to say that he cannot bear travelling (the Dutch are so lazy), but that he has seen the whole of Europe in less than two years, on account of his new system of ventilation! This reminds me of an anecdote of Donizetti, the celebrated composer. One evening, while conducting the orchestra at the French opera for the performance of one of his *chefs-d'œuvre*, a violinist inquired suddenly of the maestro—"Is it really true, Signor Donizetti, that Rossini composed the 3rd act of the "Barber of Seville" in four-and-twenty hours?"

"It's very possible," replied the composer, shrugging his shoulders, "Rossini is *so very* lazy, you know."

Every one knows what a dreadful thing it is to cut one's finger while dissecting. I lost a friend not long ago from this very accident. To-day I read in an Italian paper (*Annali di Chimica, &c.*), that during the year 1836, Dr. Nonat tried upon himself the effects of a *solution of chlorine*, after a wound from a dissecting knife. He had been examining the body of a woman who had died from puerperal fever, when he suddenly remarked a quantity of red streaks on his left hand, proceeding from a slight scratch, and spreading all up the arm. He immediately returned home, and plunged his hand and arm in chlorine water. This bath was renewed several times. The experiment succeeded perfectly, and saved Dr. Nonat's life. It was afterwards repeated by one of his pupils, with equal success; and, later still, by Dr. Garrigou. This gentleman says that chlorine water has many times preserved him from severe accidents, probably from death.

Chlorine water should, then, be kept in large quantities in the dissecting rooms of medical schools, &c. It is easily obtained by saturating pure water with chlorine gas, procured by the action of hydrochloric acid in peroxide of manganese. It must be kept in the dark, for by the action of daylight it is slowly decomposed, and forms a new hydrochloric acid with the hydrogen of the water.

Up to the present time it has been believed, and is constantly asserted in medical papers, that no remedy has been discovered to save the life of a person who accidentally wounds himself with a dissecting knife.

Vogel, the celebrated chemist of Munich, has just made known a very pretty experiment, by which oxalic acid is produced from coal gas. It is known that alcohol can be transformed into oxalic acid by the oxidising action of nitric acid. The researches of Berthelot, Robiquet, and others have proved that alcohol can be obtained from coal gas (bicarburetted hydrogen, $C_4 H_4$, sometimes called olefiant gas). It was, therefore, reasonable to suppose that oxalic acid might be formed by means of this gas. Vogel has just proved the fact by passing a current of bicarburetted hydrogen through nitric acid of a sp. gr.=1·39. The current was kept up for some days. In a short time the nitric acid became yellow, and deposited a sort of resin; shortly afterwards crystals of oxalic acid were deposited, as expected.

THE COLLODIO-ALBUMEN *v.* THE FOTHERGILL PROCESS.

To the Editor of the "Photographic News."

Sir,—Such diverse opinions having been expressed on the subject of the respective merits of the collodio-albumen and the Fothergill processes by some of the most experienced photographers, I was induced before leaving London to prepare some plates by both processes with the view of ascertaining for myself, if possible, which worked best. For the last three weeks I have been engaged in taking occasional pictures in different parts of the Isle of Thanet, with plates prepared in the manner above-mentioned, and I have great pleasure in forwarding you the result of my comparison, together with some few facts that I think may interest your readers, and may, moreover, induce some of them, who have not yet decided where to go, to visit a place which is as interesting in historical associations as any part of England, and is by no means the flat and unpicturesque country that it is generally supposed to be. I have already some of the prettiest pictures I have ever seen, and in my opinion much superior for the stereoscope to those of the greater portion of the scenes which form the staple of stereoscopic pictures, and I flatter myself that I should not have succeeded better if I had gone to the expense of a trip to the Lakes.

My first comparative experiment was made on the 25th of last month. The object I selected for the experiment was a group of three cottages, the front of the building in the foreground being covered with clematis, and with a few trees surrounding them. The gardens were divided by lumps of chalk heaped up, on which the sun's rays fell rather strongly. I exposed first with the collodio-albumen plate for one minute and a half, and subsequently with a Fothergill plate for the same length of time; merely moving the camera a few yards so as to get a picture slightly different from the first, but taking care that the objects represented in the camera should receive the same amount of illumination as in the first picture. I then put this camera in the cart, and took out a stereoscopic one, with a double lens. This I planted so as to have the objects I wished to reproduce in shadow, and again exposed a plate prepared by the collodio-albumen process, and a second by the Fothergill process, each for two minutes. In this case I made no change in the position of the camera, so that I may say they were taken under precisely identical circumstances.

On reaching the house where I was staying, I only waited until it was dark before proceeding to the development of my negatives. For the collodio-albumen process I used the developing solution, the formula of which is given by Mr. Sidebotham in a recent number of the "Photographic News," vol. i., p. 170, only substituting gallic acid for the pyrogallic. For some time no trace of a picture was visible, but at last it began to give evidence of its presence. First, the sky came out, and then a bit of the picture here and there, but so very slowly that I became impatient, and added a couple of drops of weak solution of pyrogallic acid to the developing solution. This stimulant quickened the progress of the operation, which I assisted still further by the addition of two drops of the nitrate of silver solution. The resulting negative is a moderately good one, though, if anything, rather under exposed. To develop the Fothergill plate, I used the solution mixed in the proportions given in Mr. A. Keene's formula, with a very slight accidental modification. The development in this case was much more rapid, and the details of the negative came out fuller and stronger. Its general appearance showed that the action of the light upon it had been more vigorous, but, notwithstanding, I am not prepared to say that it will give a better print than the other. On this point, however, I can only give you positive information after I return home.

I next proceeded to develop the stereoscopic plates, which I did simultaneously. In this case also the Fothergill plate was acted upon by the developing solution with much greater rapidity than that prepared by the Taupenot process; and I had fixed and washed the former before the latter was fully developed. The character of the resulting negatives was about equal in this instance also; there is perhaps a shade more density in the collodio-albumen negative, but this is so trifling as to be almost imperceptible even on a close examination.

I tried a similar experiment in taking a negative of the ruins at Richborough, formerly a Roman castle, and the remains of which are of sufficient magnitude to render a visit to them interesting. The walls are said to be twelve feet thick at the base, are of considerable height and wonderful solidity, and have a very picturesque appearance.

I am disposed to think that the best negative I have is one taken by Fothergill's process; and, vexatiously enough, the object is precisely the one about which I care least—it is simply that of an old stone gateway at Sandwich. I may remark of this old place that there are some very pretty pictures for the stereoscope to be had about it; and probably a view of Tenterden Church and steeple would be considered doubly interesting, not only from its making a picture, but from the associations connected with the good Sir Thomas More. Most of your readers are probably aware that all the ports and havens on this portion of the coast have a great tendency to silt up, several of the places formerly on the sea shore being now removed some distance inland. "In the days of Henry VIII.," says Sir Thomas More—I am speaking on the authority of a book lying on the table in the coffee-room—"divers men of worship assembled old men of the country to commune and devise about the amendment of Sandwich Haven. At which time as they began first to ensearch by reason, and by the report of old men thereabout, what thing had been the occasion that so good a haven was in so few years so sore decayed, and such sands risen, and such shallow flats made therewith, that right small vessels had now much work to come in at divers tides, where great ships were within a few years past accustomed to ride without difficulty; and some laying the fault to Goodwin Sands, some to the land inned by divers owners in the Isle of Thanet, out of the channel in which the sea was wont to compass the isle, and bring the vessels round about that, whose course at the end was wont to scour the haven, which, now the sea excluded thence for the lack of such course and scouring, is choked up with sand. As they thus alleged, divers men, divers causes, there started up one good old farmer, and said, 'My masters, ye may say every man what he will. I have marked this matter as well as some others, and I wot how it waxed right well enough. For I knew the haven good, I have marked, and so have I seen when it began to wax worse!' 'And what hath hurt it, good father?' quoth these gentlemen. 'By my faith, masters,' quoth he, 'yonder same Tenterden steeple, and nothing else!' 'Why hath the steeple hurt the haven, good father?' quoth they. 'Nay, by Our Lady, masters,' quoth he, 'I cannot tell you well why, but I wot well it hath, for, I knew that a good haven till the steeple was builded, and, by the Mary mass, I have marked it well and it never throve since!'" This is rather a long extract, but it is amusing, and may explain to many of your readers the meaning of the frequent allusion to Tenterden steeple, which occur in arguments relating to cause and effect. A person sitting near me says, that it was a clergyman of this church who once said, when speaking of the depravity of the age, "That little children who could neither speak nor walk were to be seen running about the streets cursing and swearing."

To return to my experiments, besides those enumerated above, I made several others under circumstances calculated to test the merits of the respective processes and to show any difference in the working qualities of the plates so prepared, but my experience will not as yet enable me to assign a superiority to one over the other. However, now that the weather appears to be getting more favourable for out-door operations, I propose to continue my experiments in this part, and, if you publish this letter, I shall be happy to write you again.

Have any of your readers tried Monkhoven's cellulose process in the manufacture of collodion?—I am, sir, your obedient servant, E. B.

Photographic Societies.

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American Photographical Society.—Fourth Meeting. —*March 9th*, 1859.—Dr. Draper, President, in the chair.

The Secretary was instructed to make up the record of the Society from its beginning, and present the report in full at the next meeting.

After the reading of the papers, Mr. Seely made an oral communication, of which the following is a synopsis: It has recently been shown that an undeveloped negative is capable of development after fixing. It therefore appears that the presence of iodide of silver is not necessary during development, and that the retaining film is somehow changed. I take it for granted that no iodide of silver or metallic silver can be present to serve as a nucleus for development when none can be detected by the microscope in practised hands. It seems probable that the effect of light on the iodide of silver is only molecular, and that the effect is communicated to the film, which of itself is insensitive to light. The iodide of silver and the sympathetic film are chemically unchanged from the beginning to the end. Their action in development is catalytic.

Under the order of discussion of papers read—

Mr. Rutherford said a good dry process is the great desideratum. We cannot carry our dark room and a convenient supply of water on an excursion; the thought, or sight of cumbersome apparatus and tents is unpleasant to those who dislike trouble and to work hard for amusement. A dry process need not be so quick, but it is essential that it shall be simple and certain. Albumen results are good enough, but the process is too troublesome. It is proper for this Society to make the subject of a dry process a conspicuous problem, and to encourage attempts at its solution. Mr. Rutherford concluded his remarks by moving that a prize of one hundred dollars be offered in the name of the Society for the best dry process offered for competition during the next few months.

After some discussion the subject was referred to the board of directors.

Mr. Boyle made some remarks on the colours of clouds and mists, especially with reference to the art of painting.

Mr. Seely, in commending the paper read by Dr. H. Draper,* observed, that the intensity of blackness, as shown by the specimens exhibited, was greater than that produced by the chloride of gold, or mercury, or the sulphides. If so, the chloride of palladium would soon come into use as a toning agent for transparent positives on glass. The photographic uses of the rarer metals should be studied. No doubt, valuable qualities are to be found in substances not yet thought of. The metal uranium has recently come into quite extensive use in Europe. Mr. Burnet is entitled to most of the credit given to Niépce de St. Victor, for the discovery of the properties of nitrate of uranium. The salts of uranium has excited little attention in America, for the reason that it was shown at an early day, that iron salts were possessed of the same properties, and could be substituted in all the uranium processes.

Dr. Deck: There is difficulty in procuring palladium, especially of the desirable purity; it is not a commercial article and but little is produced. It has been used by dentists, and for the beams of balances. It costs about seven dollars per oz.

The President: I have found the chloride of palladium very useful in producing photographs of microscopic objects.

In answer to a question, Dr. H. Draper said that he had not observed that the chloride of palladium produced varieties of tint, as obtained with chloride of gold and sulphides. It acted very promptly, and gave only shades of blackness.

Dr. Vanderweyde described some of the ordinary methods of strengthening. He preferred a process in which iodine was used, as the thin iodide of silver negative was quite intense towards the chemical rays.

Mr. Seely: I understand that at a recent meeting of the Farmers' Club, the opinion was emphatically expressed that the moon has no influence on vegetation, and that the notion which some farmers have, that the moon should be consulted for the time of planting, was treated as unworthy of attention. I am not prepared to say what specific or observable action the moon might be expected to have on the growth or health of animals or plants; yet I do not think it improper to propose the question in this society. The physical action of the moon by virtue of gravitation, in producing tides in the seas and the air, is everywhere felt. May there not be a perceptible chemical action on the earth from the moon's rays? Mr. Rutherford gets a photographic impression of the moon in a few seconds. Are there undiscovered chemical peculiarities in moonlight? May there not be plants of such a delicate nature that they protect themselves from sunlight, come out by night, and thrive by the light of the moon? There are many animals like the owl, that are wakeful only at night; the moon to such is what the sun is to us. I wish only to have it understood that some of those questions about the moon's influence, treated with so much contempt by scientific men, may yet be fairly asked again.

The President: Ten years since Mr. Hunt made experiments on the effect of light on the growth of plants, and came to the conclusion that the indigo ray favoured the germination of seeds, while the yellow rays retarded it. After the plant has appeared above the surface of the ground, the illuminating or yellow rays, are essential to its healthy growth, enabling it to decompose carbonic acid, and to appropriate the carbon. In ripening, or producing seeds, the red rays are essential. Dr. Gardner has exhibited some very curious experiments to show that it is the indigo ray which determines the growth or turning of the plant towards light. Turnip seeds were planted in a box, which was kept in the dark; at the end of forty-eight hours the plants had come up wiry and thin, of a sickly yellow hue, and standing erect and straight. The box being now placed in the solar spectrum, all the shoots soon turned towards the indigo ray. The plants might even be made to grow downward. Moonlight in its degree, acts like sunlight: sunlight is 200,000 times more intense. (In answer to a question.) The maximum of chemical power is found in the indigo, and not in the violet, as stated by some. The common crocus is a plant which is remarkably sensitive to light; cover it with your hat and the leaves fold up, let the light fall on it again, and they open so rapidly that you may see them move.

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* Reported in the last number of the "Photographic News," No. 41 p. 171

Dr. Deck: It is well known that tadpoles kept in the dark do not change to frogs, but continue to grow as tadpoles till they become monsters in size. On the contrary, if, while young, they are exposed to an excess of light, I suppose they will become frogs prematurely. The stories of showers of frogs are often ranked with stories of sea-serpents and mermaids; but I have witnessed a veritable frog shower, when hundreds of bushels came down. The frogs were none of them alive, and were remarkably small. I suppose the frog spawn was carried up by a water-spout, and under the influence of the light and air, the tadpoles were prematurely changed to frogs.

Mr. Tillman: At an exhibition of fireworks in commemoration of the completion of the Ridgwood Water-works, a very curious and novel effect of coloured light was produced. As the director of the display is a member of the Society, we may expect some account of it at our next meeting. The art of pyrotechny is fairly within the scope of our discussions. What is the best procession of colours to produce the highest effect? How best to combine poetry of colours and dramatic action? Who can foretell the effects which will hereafter be produced by overtures of variegated lights?

At this point a very entertaining discussion ensued on the turning of the sunflower towards the light. Although many of the members engaged in it, the subject elicited more wit and poetry than scientific truth. It was a refreshing episode.

A gentleman in the audience, and not a member of the Society, occupied a considerable time in endeavouring to convince the Society that he had perfected a valuable and wonderful process of transferring ambrotypes to paper.

Mr. Tillman: Will the gentleman communicate some details of his invention to the Society, or exhibit specimens?

The **Gentleman**: The process has cost me a great deal of money, time, and study; I do not propose to give it away.

Mr. Seely: Whether an inventor shall give his ideas to the public, or sell them, is a question for himself to settle. We cannot blame him for the decision he makes. In the Society we publish discoveries; we must not make it a market place Let this be the occasion for determining our course for the future, so that there shall be no misunderstanding.

The subject elicited considerable feeling all in the same direction, and, after remarks by various members, the sentiment of the Society was expressed by the unanimous adoption of the following resolution presented by Mr. Stetson:—

Resolved—That this Society desires and expects that in every instance where either members or guests claim to be in possession of improvements, either the new results or the details of the invention, or both, be given to the meeting.

Adjourned to the second Monday in June.

Photographic Notes and Queries.

THE LINSEED DRY PROCESS.

Sir,—I beg to reply to the questions of your correspondent "Warrengal," vol ii. p. 180, and at the same time to state my reasons for employing linseed as a preservative for collodion. I have long felt assured, from numerous experiments, that atmospheric action exerts a far greater amount of influence on sensitised collodion than we are, at present, aware of; and, therefore, that the following requisites are absolutely necessary for the preservation, and subsequent development, of a collodion plate. 1st. Some agent that will perfectly exclude the sensitive film from all contact with the atmosphere, and be at the same time moderately elastic, and perfectly transparent. 2nd. That it shall exert no chemical action whatever, or be liable to be acted upon by the nitrate of silver, or other products in combination with it. 3rd. That it shall be such as to be readily dissolved, so as to leave the film in precisely the same condition as it was previous to its application, in order that the development may be proceeded with, uninfluenced by any intervening substance. These desiderata being gained, a prepared plate may undoubtedly retain its photogenic powers for an indefinite period. I found, by using linseed mucilage, that the first and last of these requisites were certainly attained, and I believe the second also, but on this point I have not chemical knowledge sufficient to speak decidedly, and can only say that I find it practically correct.

With regard to the length of time the plates prepared according to my plan will keep, I can only speak with certainty as to three weeks, having never had occasion to preserve them longer; but I have found no alteration whatever at that period. I have now, however, prepared, as a fair test, 24 plates, one of which I shall use every fortnight, and I am quite sanguine that I shall find the last equally as sensitive as the first. The exposure for stereoscopic pictures with my lens, on a good day, is one minute to one-and-a-half minutes, but this, of course, varies greatly according to lens, subject, climate, &c. The first is equally good, and, perhaps, easier to use. The mucilage should not be too strong; I find it gives the best results when it will run through fine muslin in one continuous stream; it is also preferable to wash the plate by immersion, a stream being apt to free the nitrate irregularly from the collodion. I must apologise for this long letter, but I should wish any gentleman who feels inclined to try the linseed to be cognisant of my reasons for adopting it. . . . .

W. W. Hughes.

Nantua (Ain), France.

[We thank our correspondent for the valuable information on the above subject, and shall be pleased to receive the account of the tour mentioned in the latter part of his letter. If he will favour us with it, we do not doubt it will prove of great interest at this season of the year.—Ed.]

THE OXYMEL PROCESS.

Sir,—In answer to "Philoxymel" (vol. ii. p. 167), I fancy the pin-holes that he complains of arise from the sulphur that the honey contains, which is acquired in the destruction of the bees.

I tried the oxymel process for some time, and not being able to work it satisfactorily, I made a modification of the above process, and which appeared in the pages of one of your contemporaries.

In place of honey, I use a preservative solution as follows:—

Best white sugar	2 ounces.
Distilled water	2 ounces.
Glacial acetic acid	1 drachm.

Dissolve and filter.

When the plate is excited, wash with a small quantity of water until the greasy appearance is gone; drain partially, then pour on the preservative solution from a wide-mouthed cup, giving it three coatings, and delaying each operation or coating one minute; then stand aside, to drain on blotting paper.

After exposure, which in this process is very short, if properly prepared, develop with—

Pyrogallic acid	2 grains.
Citric acid	1 grain.
Alcohol	1 drachm.
Water	1 ounce.

To which a few drops of the nitrate bath must be added before development.

After the exposure and before development, it is as well to soak the plates in the following solution, to remove the preservative solution:—

Alcohol	1 ounce.
Water	10 ounces.

Any negative collodion will do, but it is advisable to have an old one, and one prepared for dry processes.

Littleboro'. A. Whitham.

SPLITTING OFF OF THE FILM.

Sir,—In answer to one of your Minor Queries, "Splitting off of the Film," in vol. ii., p. 132, you will perhaps permit me to make a few remarks, which, if you consider them of use to "Verger," or any other of your numerous readers, are quite at your service. For some months past I have been in the habit, in landscape photography, of developing with iron, clearing off the iodide with cyanide, and, after well washing, pouring over the plate one part of pure glycerine, and three parts of rain water, and subsequently strengthening with pyrogallic, acetic acid, and nitrate of silver. The advantages of this method are fourfold—1st. It enables you to keep a plate perfectly moist for a week, or longer if you wish it. 2ndly. The glycerine has the singular property of preventing that untoward accident of the film peeling off—under the pyrogallic or iron developer and abundant washing. 3rdly. It saves an immense amount of time in the field, as the operation of strengthening can be much better performed at home; and, 4thly. The requisite amount of water is considerably lessened—no trifling consideration on most occasions. My plate box is also varnished with shell-lac inside and out, and is perfectly waterproof.

A professional of considerable experience in this neighbourhood has followed my example, and so satisfied is he with its simplicity and success, that he now always leaves the hypo. behind. In portraiture I also use an iron developer; I adopt the same plan, coating each plate with glycerine when finished, placing the plate on a shelf, and strengthening afterwards, as opportunity serves. Before strengthening I wash off the glycerine under a tap; but sometimes, and successfully, add a fresh portion of glycerine to the developer.

I was first induced to use glycerine from its known property of retaining moisture. I inclose my card, and a stereogram developed and strengthened as above.

M. D., Oxon. R. M. S.

DRY COLLODION PROCESS, WITH RESIN.

Sir,—Mr. Hardwich speaks, in the last edition of his Photographic Chemistry, p. 374, of a dry process by the Abbé Despratz, which, if good, is certainly very simple and easy; it is merely adding white resin to iodised collodion, and then treating it nearly as for the wet process. Mr. Hardwich does not tell the proportion of resin used by Despratz.

I have been experimenting on it for some days back—beginning with ten grains of resin to the ounce, and finally coming down to two grains. I find it very sensitive—about 45 seconds—but it is very capricious in the results, curtains and feathers, and such like, springing up without any assignable cause. Still, as it promises well, I should wish for further information.

When I used ten grains of resin to the ounce of collodion, I found, on removing the plate from the dark frame, a beautiful *white* picture, impressed on a grey ground.

M. M. D.

THE COLLODIO-ALBUMEN PROCESS.

A valued correspondent has asked us to inquire if any of our readers have made experiments, or observed any facts, which would tend to throw light on the cause of dry plates deteriorating by being kept. If we could once get at the chemical change which takes place, we might hope then to arrive at a preventive, and, perhaps, eventually discover a method of restoring over-kept plates.—Ed.

ANSWERS TO MINOR QUERIES.

Test for good Gun Cotton.—*M. O. R.* After the gun-cotton is dissolved in the alcohol and ether to the requisite thickness, pour a small quantity of the plain collodion on a piece of glass, allowing it to drain off in the same manner as in coating the plate with iodised collodion. If the glass appears perfectly clear and transparent after it is dried, and viewed by transmitted light, the gun-cotton may be used for photographic purposes; but if there should appear any milkiness or opacity on the surface of the glass, there is most likely a fault in the gun-cotton. Unless a perfectly clear and transparent film is obtained, the collodion properly sensitised will not furnish good results.

Detection of Free Iodine in Solutions.—*Polyphemus.* Your red collodion does contain free iodine, although you have failed to detect it by the starch test in the ordinary way. The characteristic purple coloration fails to show itself if starch be merely put into collodion, or similar ethereal liquid containing iodine—water being necessary for the reaction. If you pour a few drops of the collodion under examination on to a piece of the crumb of bread (which contains starch), and then, when the spirit has evaporated, moisten it with water, the smallest trace of free iodine present will be shown by the production of a purple stain.

TO CORRESPONDENTS.

☞ Some complaints having been made by our subscribers as to the non-receipt of the "Photographic News," the publishers beg respectfully to notify that every care is taken on their part to insure punctual and correct dispatch. All complaints should, therefore, be made to the Post Office authorities.

Neal Flaherty.—The crystal inclosed is bichromate of potassa, not prussiate of potassa, as you imagine. It is used in photography; and its properties have, on more than one occasion, been described in the "Photographic News."

J. F. (Exeter).—Either the process of re-development after fixing and well washing, or darkening by means of bichloride of palladium, as described in our last number by Professor Draper (though we have not tried this latter process), would, we think, be preferable to the one you are at present adopting.

W. L. C.—1. Yes; it must be saturated with iodide. 2. We think the plates would be better, if not more than two or three hours were allowed to elapse between the exposure to the vapour of iodine and the sensitising. 3. The exposure to the vapour of iodine may be done in the light, but the sensitising must, of course, be done in the dark. 4. Several days. 5. Several days also. 6. Develop, wash, fix, wash, and dry. 7. We cannot answer this; we think experience in the process is the chief thing wanted. 8. A dozen or two collodio-albumen plates can be prepared in an hour or so, by arranging so that the operations follow each other in proper order; but it will not do to first coat with collodion, and then leave the sensitising till the next day. Follow some of the articles which we have already published on the subject; or, if preferable, pick out something of each and make a process that way.

W. R. (Eton).—One question has been answered by post, the other is not in our power to answer.

Jean G.—Received.

R. M. S.—Your second letter has not arrived in time to prevent the insertion of the former one. We do not think the valuable facts contained in it are known, and should have been sorry if any remarks of a contemporary had prevented your benefiting our fellow labourers in the art.

M. N.—1. Your collodion is not good; use a colourless one prepared with cadmium. 2. Use Davanne and Jouet's developer, as described in a recent number. 3. We do not like alcoholic collodion at all.

N. Taylor.—We think you will have to get them made to order. A large specimen is now in preparation.

R. Gordon.—Place a mat on the picture, and mark the shape required with a pencil, and then cut it out with a sharp pair of scissors. You must try and find out such very simple points of manipulation for yourself: we could not describe them intelligibly in print.

X. Y. Z.—1. Perhaps, as you suggest, your pyrogallic acid has deteriorated by keeping. We hardly know which to prefer; both Mr. Lyte's and Θ's are very good processes.

T. A.—We will give your letters further attention.

Paper.—The spot is caused by the stream of developing solution being poured on at one spot, washing away the nitrate of silver from that portion of the sensitive film, and so preventing the proper action of the solution. Pour it on gently along one edge of the plate, and the fault will not occur.

Amateur.—1. Your only remedy is to paint, or otherwise stop out the sky, as described in former numbers. 2. The preparation of oxygen gas is not dangerous in the hands of a person at all acquainted with chemical manipulations, but, like all other similar operations, it requires care.

West Brompton.—Your picture could not have been sufficiently washed after it was fixed, or it would never have faded in the manner you state. It should not have been put into the box wet, as if there were any tendency to fade, that would be sure to hasten it.

Bath.—Your bath has unquestionably suffered by the treatment it has undergone, but whether or no it be unfit to use for exciting some Fothergill plates, is a question which only experiment can decide.

Box.—We think that you ought not to expose so long as 15 seconds for a portrait with a good light and lens; although much would doubtless depend upon the exact meaning of the term good.

L. S. T.—The use of the stop in a lens is to confine the action of the middle of the lens to the middle of the picture, and that of the side of the lens to the side of the picture; and, therefore, if the size of the lens and distance of the stop are not duly proportioned to each other, the picture will suffer.

Communications declined, with thanks:—Delta.—F. O.—A Juryman.—X. Y. Z.—An Old Card.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—A. J. O. P.—L. E. T.—Hypo.—P. R. O.—Key.—A Very Young Tyro.

In Type:—Reticulus.—J. Walter.—Ponçon.—M. M. D.—N. C.—G. S.—H. T. T.—William Boyer.—T. H. S.—A Subscriber.—G. H. W.—Vlator.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 43.—*July* 1, 1859.

THE TENERIFFE ASTRONOMICAL EXPERIMENT OF 1856.

CONCLUDING NOTICE.

By far the most interesting and important to photographers of all the valuable facts observed during the short time of the expedition, are the observations on the lines in the solar spectrum. These were made with as much care as the importance of the case deserved, and the results obtained seem to show, almost conclusively, that some at least of these curious halts and stoppages in the uniform progression of the wave length, and perfect blending of the spectrum colours into each other, are due to the absorptive action of the earth's atmosphere. The observations under this section are so interesting, that we are induced to quote them as fully as we are enabled in the absence of the beautiful maps of the lines with which the volume before us is illustrated.

"Towards observing the black lines of the solar spectrum, we had a speculum to reflect sunlight, kindly furnished by Mr. J. Nasmyth, C.E.; and an apparatus, consisting of a prism, a fine adjustable slit, placed in the focus of a 2-inch object glass, and a telescope of the same size, with magnifying powers as high as 30, prepared for, and lent to us by, Mr. Airy. There was no angular measurement contemplated; only eye observation and comparison of differences between the spectrum seen and that engraved by Fraunhofer. To employ these instruments on Guajara, a small chamber, some 10 feet square, was built of rude stone, roofed in with planks and old canvas, and further covered with a quantity of '*retama*' branches, to keep out every particle of the sun's light, while a square tube of wood, 5 feet long, with a moderate aperture at the end, was thrust through the wall in the direction of the speculum mounted on a small stone pier outside. In this manner, a considerable degree of darkness was secured, even when the sun's rays were being reflected into the instrument.

"A cursory examination of the spectrum showed much general correspondence with Fraunhofer's view as to the principal lines; but so great a discordance, as to detail, that I thought it better to proceed on an entirely independent footing, and make angular drawings of what I saw; and, when well satisfied with them, to compare them with the engraving. One evening, trying the sun unusually low, and finding new features worth following up further than could be done while using the reflected ray from the speculum, I took the prism apparatus out into the open air, and, by means of a theodolite stand and photographic black bag, was enabled to continue the observations until the sun set at the usual mountain zenith distance of 91° 11′. These direct observations of the sun were repeated on many occasions with the sun, both west and east. The lunar spectrum and that of the blue sky were also similarly examined.

"So far for the Guajara experiences. At Alta Vista a similar optical dark room was prepared, but profiting by hints procured from the direct line instrument at low altitudes, I tried it on the sun at midday in the same manner, when an immense increase in the number and definition of the black lines at the violet end took place. With the reflected ray, the two bars of H could but just be discerned as faint nebulous streaks, B, C, and D, being as sharp and as black as silver wires in a telescope; with the direct ray, the individual lines composing the bars of H could be distinctly separated, and many lines appeared indistinctly in the space beyond. The conclusion thence to be derived was, unfortunately, that our particular speculum did not reflect the violet end of the spectrum; and our observations were, therefore, not comparable in that part, even if they were in others, with standard observations elsewhere. The discovery was made too late to enable a *direct* determination to be made for Guajara, but the method was employed for Orotava, when we returned there from the mountain a few days after."

In a table appended to the report, Professor Smyth gives copies of the whole of the drawings of the red end of the spectra, that were taken at the three stations, on the same scale as Fraunhofer's justly celebrated Munich engraving. From a comparative examination of these, the following conclusions are deduced:—

"Bearing in mind that great accuracy of position is not pretended, and that, though much care was bestowed on the general appearance, thickness, and definition of the lines, the shortness of the time available was entirely inadequate to procuring a good drawing, and that several of the diagrams should be employed together in deducing a result, we may now proceed to the examination. Comparing the eleven Teneriffe spectrums of the sun with Fraunhofer's, we can only assume identity in place of the lines A, *a*, B, C, D, E, and *b*: everything else appears differently. Of this difference the prevailing feature appears to be, that whereas Fraunhofer's spectrum stretches to beyond A, which is seen by him as a clear and distinct line; he gives none of the numerous broad bands and groups of lines between A and *a*, and *a* and B that were visible on the mountain, and below whenever A was quite or nearly visible.

"From the fact of Fraunhofer's spectrum including A, we might be entitled to expect from the Teneriffe observations that it represents the sunset appearance; but, then, how can the omission of the broad bands of lines between A and B, and C and D, and especially those beyond D, be explained? If, on the contrary, the absence of those marked bands is to be regarded as a proof that a high spectrum was intended, my own spectra indicate that A should not be seen in such a position. Again, while the spaces between A *a* and *a* B are blank in Fraunhofer's and well filled in Teneriffe, he has some lines between B and C, a compartment always remarkably empty with us. . . . . . . A zenith spectrum, then, at that height (8,903 feet), and with the particular apparatus employed, would appear to begin between *a* and B; and, excepting the lines C and D, to have nothing noticeable between B and E. A horizontal spectrum, on the other hand, station and instrument remaining the same, begins outside A, has numerous powerful bands of lines between A and B, but none between B and C; and, while C has not increased in thickness, B has more than quadrupled its size, maintaining full sharpness and definition. Again, a certain excessively fine line, at the distance of B to C, beyond C, has grown to many times the thickness of the latter, and is accompanied by a broad and marked band of finer lines. A more extensive increase still is perceived in the innumerable lines between C and D, and immediately beyond D. Of these variations from a zenith spectrum, as observed phenomena, there is no doubt; for the series of drawings taken quite independently are found, on being now brought together, to confirm each other in the result of the growth of these lines with the zenith distance. The observations of August 9 are the most important to this end; there were three drawings obtained the same evening, and the lines grew visibly under my eyes, the red end apparently lengthened out from B to A; additional lines were seen every succeeding moment, and the old ones became better defined, causing nebulous bands at 85° zenith distance to become groups of fine black lines at 91° zenith distance. Looking at the same time to the notes of colour, the red *seems* continually to have grown to the final exclusion at 91° zenith distance, of yellow as a pure colour, orange merging at once into green. . .

"Professor Stokes, indeed, suggests that the deficiency of the red end of my high mountain spectra may be due to the more luminous rays extinguishing the faint red; and that, if the former had been absorbed by a cobalt-blue glass, or the extreme red separated by refraction through a second prism, A might have been seen; just as, in fact, it was seen with the low-sun spectra, when the atmosphere acted the part of a suitable absorbing medium; and the suggestion is of extreme value for future experiments, though it is proper to state that, on Teneriffe, the magnifying power employed was such as necessarily to throw the brightest part of the spectrum out of the field of view, when the extreme red was under examination."

Some differences were also observed in the spectrum of the light from illuminated portions of the sky. We thus find it stated that, "taking together the whole of the sky spectrums, and comparing them with those of the sun, we find that C is not marked in circumstances where it might be expected: and when it does appear, it is overpowered by the growing line in the direction of D. Likewise D is overpowered by the numerous broad bands beyond it, so that when the spectrum is seen faintly, these variable lines might easily be mistaken for C and D, and a greater degree of identity might thence be considered to prevail between the sun and sky spectrums than actually obtains.

"The moon was not well situated for spectrum observations, though drawings were obtained on August 13th and 15th at altitudes of 25° and 38°, and at times two days before, and on the night of the full moon.

"The most striking feature was the blood-red character of the red end; beyond the extreme intensity of this colour, the other tints had nothing notably different from a sun spectrum. Notwithstanding the amount of red light, no lines could be perceived there; in this circumstance was a striking difference to the low-sun spectrums, where, as the red became prominent, the number, size, and visibility of the lines in the red increased also. The first line identified, in advancing from the red end, was the growing line between C and D; from thence was a long blank space, until three fine lines, near E, were seen, then E and F. These observations were direct.

"Eight drawings of the violet end of the sun's spectrum, two of the sky's, and two of the moon's, were obtained, but most of them laboured under the untoward effects of the speculum. It may suffice to remark that at Guajara, the vertical sun and spectrum terminated beyond H, while the horizontal sun spectrum was so shortened at that end as to terminate between H and G.

"Again, comparing a high sun spectrum, at the sea level, with a similar one at Alta Vista, 10,702 feet high, both observed direct, it was found that, while in the former the spectrum terminated immediately beyond H, and the two bars of H were nebulous, in the latter the spectrum extended beyond H to three times the distance of its bars asunder; the two said bars also lost all their nebulosity, being clearly resolved into their component lines; many fine clear lines were seen between them, and many appeared nebulously in the space beyond. In the sky spectrums, and more particularly in those of the moon, the prominence of G was remarkable; next came F, while H was nearly, if not quite, invisible.

"At Guajara, many experiments were made in the dark optical room with a quartz train, lent by Professor Stokes, but they are all unfortunately faulty, by reason of the speculum employed.

"Of two large drawings that were made on August 10 and 12, near noon, one terminates at the limiting line, in a drawing of the extended spectrum, furnished to me by Professor Stokes, the other contains two lines more. . . . . . . The mean, then, of the observations, on August 10 and 12, shows that a little more of Stokes' new portion was seen on the mountain than has been seen near the sea level, notwithstanding the drawback of the speculum; while, if we add for that which we are fairly enabled to do from the two views of H—direct and reflected—we may assume that there is a much greater amount of the more refrangible rays in the sun's light in the upper than in the lower regions of the atmosphere.

"This result is confirmed by another observation. The spectrum formed by the quartz train was frequently photographed on a collodion plate, and the image so formed was found identical with that presented to the eye by uranium glass. Taking these powerful photographic effects as an indication of the abundance of rays of high refrangibility, it is very remarkable to find, on looking over my landscape photographs, about 200 in number, and pretty nearly equally divided between the three stations, Orotava, Guajara, and Alta Vista, that not only is there always a greater intensity, but that the distances came out invariably much better in proportion as the station is higher.

"At the height of 10,702 feet, the eastern wall of the crater of elevation, distant some four miles, is given with all the detail that the eye could appreciate at the time; while at the sea level on the finest mornings, and when the cliffs above Realejo, not three miles distant, were vividly illuminated by the morning sun, and casting on one side dense and dark shadows, yet the photographs would persist in giving nothing but the mass of the mountain in one uniform tint, save only one remarkably white stratum. This, at least, testifies to the focus having been exact; while the detail of things in the foreground is represented with such vigour as to prove that the quality of the photographic material was by no means deficient.

"In place of showing the mountain with all the intense detail brought out to the eye by the sun shining strongly on its rocky slopes, the appearance was rather as if that luminary were on the other side, and we only saw the shaded form of the ridge. Or it might be likened to the effect that would have taken place to the eye, had the mountain been seen through a much greater depth of atmosphere, or had that atmosphere been thicker as with a diffusion of smoke throughout it."

These results are very curious, but far from throwing any light on the theory of atmospheric absorption, they seem to render the subject more complicated than ever. We can imagine a medium acting like a sieve, and obstructing the spectrum at one end or the other, to a greater or less extent, according to its thickness; and, bearing in mind the results obtained by Herschel at the heat end of the spectrum, and by ourselves at the chemical end, we were prepared for a discovery of greater transparency at the two extremes—that the observer might possibly penetrate further into the red, and further into the violet end; but, instead of this, the actual extent visible seems to be even less at each end, at an altitude of 8,900 feet, than near the level of the sea, whilst the chief effect of the atmosphere is apparent in its absorptive action on points in the intermediate parts of the spectrum.

We cannot help suspecting that the observer missed the lines in the spectrum of the zenith sun, not because they were really absent, but because the brilliancy of the contiguous luminous rays was such as to render invisible, by irradiation, the narrow black lines. Our own researches on the spectrum, during many years past, have convinced us that the whole spectrum is entirely covered with a mass of dark lines, of varying degrees of intensity and visibility according to the brilliancy of the light, the diameter of the slit, and the optical power brought to bear upon them. With a bright beam of sunlight, and a slit of a diameter of 0·005 of an inch or upwards, the fainter and finer lines are almost invisible, by reason of the dazzling brightness of the luminous lines, but with a diminution of the aperture, they reappear at once, and every increase in the magnifying power seems to bring them into existence in such numbers that, at last, the usual distinctive features of Fraunhofer's lines have entirely disappeared, and the eye in vain seeks for some point of resemblance. What is gained in detail seems to be lost in breadth of effect, and it is difficult to imagine that the one spectrum is nothing more than the former viewed under more accurate circumstances of illumination, production, and magnifying power. The spectrum seems to resemble, in this respect, some of the more distant nebulæ which entirely alter their character and outline, according to the power of the telescope which is brought to bear upon them; and, on this account, we think it more probable that some of the vacancies observed in the zenith spectrum, by Professor Smyth, might have been seen to have been fitted up with lines, provided the circumstances for observation had been such as to allow of deliberate and long-continued experimental research. We wish that more had been told us about the photographic results obtained with the spectrum; here, the above sources of error would not have interfered, as it would have been very easy to have taken spectra for comparison near the level of the sea, with the sun at any desired altitude, and, knowing the diameter of the slit to be employed, the identity or dissimilarity of the two effects could be at once seen.

To scientific observers the "Great Dragon Tree," of Villa Orotava, could not fail to be a subject to attract their attention, possessing as it does the reputation of being the "oldest inhabitant in the world," having seen some 6,000 years come and go since it first took root. In fact, several pages of the report are occupied in a critical examination of the evidence upon which this enormous age is arrived at, and in a discussion of the various accounts of this tree, which are already before the world. An amusing instance is here given of the manner in which popular accounts of celebrated places and scenes are made up to suit the popular taste. Towards the end of the last century an artist named Ozone, who accompanied the Chevalier De Borda to Teneriffe, made a sketch of the tree. Humboldt, in the "Atlas Pittoresque," also gave a view of it, not, however, copied from nature, but through the medium of M. Marchais, from this sketch of Ozone's. And finally, MacGillivray, in his account of Humboldt's travels, has given a third sketch, copied from the plate in the "Atlas Pittoresque."

Photographs from Ozone, Humboldt, and MacGillivray, are given. Compared with the one of the tree itself, they show the immense debt which the scientific world owes to the inventors of photography, not only in replacing the artist's original sketch, but also in performing the subsequent copyings: for induction from the facts clearly demonstrates that even in the simplest feature, man following his fellow man diverges inevitably at every step further and further from truth, as it is in nature. Thus, not only does the tree in each succeeding copy rise to a greater height than before, its foliage becomes more abundant and conformable to European types, its trunk more ligneous and solid, and the ground round about more flat and open, but a mere bit of gardener's scaffolding, that supports a bending branch on one side of the tree, and has nine cross bars to permit vines to clamber up, is transformed by Ozone into a ladder with 14 rounds, increased to 28 by Humboldt, and to 32 by MacGillivray, each of them professing all the time to give a faithful reproduction of his predecessor's picture.

As stated at the commencement of this article, it was considered that a series of photographic records of the various natural objects in Teneriffe would be of great value and interest, as they would be more able to illustrate the various natural features of the localities described than hand drawings. The following observation show how little appreciated were the beautiful stereoscopic pictures which, in accordance with this suggestion, Professor Smyth employed all his spare moments to take.

" . . . . . . With the assistance of a professional printer in Edinburgh, I was enabled, in the beginning of 1857, to present the Admiralty with a series of 74 double positive pictures on paper, forming vol. x. of the MS. report, besides a few others attached to vol. vi., and now in the possession of the Royal Society. Vol. x. was also presented by the Admiralty to that body with the subsequent offer from myself, through their secretary, of assisting in the preparation of enlarged glass negatives of any subjects that might be selected for illustrating the report; but after several months the collection was returned.

"Duly bearing in mind the bursts of enthusiasm with which the birth of photography was hailed by all scientific men, and the prophetic descriptions that were indulged in by the venerable Arago, and a circle of the philosophers of that time, as to the infinite improvement which would, from that day forward, occur to all scientific illustrations, which were, according to them, no longer to be left to the caprice of an artist, but were now to be submitted, 'during their formation, to the rules of geometry,' some disappointment must be felt on looking round now, and finding how little has been brought to pass of those magnificent dicta, uttered years ago by great men to whom the world gave implicit credence.

"In spite of such predictions, photography has not taken that special and useful line on the strength or the hopes of which the French Government were moved in 1838; for it is not reforming and supplanting all other methods of illustrating scientific memoirs. Where is the fault or difficulty? It is not in photography itself, for an example of the perfectly practicable nature of Talbotype photographic illustration has been offered by the well-known scientific publisher, Mr. Lovell Reeve; for having been applied to, about half a year after the official Teneriffe report had been read in public before the Royal Society, to issue a popular narrative, he was so much struck with the amount of important fact, geological and botanical, contained in some of the photographs, that he undertook to introduce twenty of them into an octavo volume; and accomplished it at the most difficult season of the year, viz., the depth of winter, for so large an edition as 2,000 copies."

Has this Teneriffe experiment, then, served to prove or disprove the propriety of Newton's opinion as to the favourable qualities of high mountains for astronomical observatories?

Most eminently, we may answer, to prove it; for how otherwise could so large a harvest of astronomical and general scientific facts, as are indicated in the report, have been gathered in so short a time, and by a single government servant, limited in the expense he might incur to one-sixth or one-tenth of what an ordinary expedition usually costs the country? If, too, for more than a century the suggestive proposition of Britain's greatest philosopher was neglected because thought impracticable, what an efficient answer can now be returned in the simple statement that the Admiralty gave their sanction for preparations to be commenced on the 30th of April, 1856, and within nine weeks from that date an astronomical station was successfully established on Mount Guajara, at an elevation of more than 5,000 feet above the clouds.

When the whole of the trial had been concluded and the instruments brought safely home, an eminent French savan, reviewing the entire proceedings, emphatically wrote that the little expedition which returned to England in October, 1856, had inaugurated a new and powerful system of astronomical observation; and he proposed that France should at once follow in the same line with a station on the Pic du Midi.

France, however, has not yet taken this step; and the working out of Newton's happy idea of mountain astronomy still remains to Newton's own countrymen.

PHOTOGRAPHY AT THE SEAT OF WAR.

(*From our Own Correspondent.*)

Casastroso, May 13.

Sir,—I was about to leave here, intending to make my way to Alessandria, when I heard of a great movement among the Austrians in Vercelli; at the same time that I was told by parties of Sardinian and French cavalry who come here from time to time, that they would soon be down in force to attack the enemy, consequently I determined on remaining where I was until something decisive took place.

The distance from Casastroso to Vercelli is only about seven English miles, at least; judging by the time it took me to walk near enough to see the people moving about the streets with the aid of a reasonably good opera-glass, I should not think it more. I often see parties of Austrians, sometimes infantry, but generally cavalry, when I am out walking, and I take care to put myself out of their way until they have disappeared; but the Piedmontese do not seem to care for them: I have seen them go on with their work without hardly turning their heads round as the Austrian cavalry went tramping along the road beside them. There is none of that savage enmity between them which characterised the war between the French and Spaniards. It is not to be supposed that the Piedmontese have any partiality for the men who plunder them, that is hardly to be expected; you would be rather surprised yourself if you heard a man who had just had his watch stolen, profess a very lively interest in the welfare of the thief, even though he were one of his own countrymen; but barring these exactions, I don't think the Piedmontese have much to complain of. Of one thing I feel pretty certain, that if the troops of almost any other country except Austria had invaded Piedmont, the people would have had much greater cause for complaint. As it is, I have heard frequent complaints of the French soldiers having deluded young women from their homes; but no official complaint can be made on this score, as there is no question whatever of violence; the women have acted of their own free will.

On the 11th the Austrians sent out detachments of considerable force from Vercelli in this direction, some of whom passed on towards Desana, which is a rather larger place than this, and about two miles distant on the main road. As soon as it was pretty certain that they were coming here, my camera and tent were stowed away in a hiding place prepared for it at the back of an outhouse, where even a Croat would hardly think of looking for anything to take away with him. I walked into the fields smoking a cigar, feeling certain that they would not go out of their way to meddle with a single individual unless they had some special reason for so doing, but in getting out of the frying-pan I tumbled into the fire, for I had not gone very far before I saw a party of Austrians lying under the shade of a cluster of trees. As I had never thought of meeting any of them in this direction I had not kept a look out, and they saw me before I saw them. To go back would have looked suspicious, and there might have been the same objection to have gone direct to them, so I did neither, I turned aside and walked in the direction of Sali. Presently I heard loud shouts, and turning round I became conscious of a number of hands beckoning me to come back; a gesture I thought it prudent, under the circumstances, to obey. As soon as I was within a few yards, an officer stepped forward and addressed me in German. I know a little of this language, but I did not think it advisable to appear to do so, so I answered him in English, which I found he understood perfectly. He asked me some questions, which I answered freely; and ultimately I told him what my intentions were in coming to Piedmont. We parted very good friends after a short conversation, during which he told me he thought my desire to see a battle would be soonest gratified if I remained where I was.

All that day I saw troops passing to and from Vercelli, but I fancy that many, if not all, of those who left returned the same evening "bringing their spoil with them."

The troops that continually pass and repass within a short distance prevented me from taking my camera out, as I am afraid they might imagine I had some sinister design against them. and it is even possible they might fancy it to be some new implement of war, and deprive me of it under that impression; but the greatest danger arises from the former reason, from their fancying that I may be taking plans of the Austrian positions in and about Vercelli for the benefit of the Allies. Consequently the time hangs heavily on my hands, in spite of the marchings and countermarchings. Now and then we are roused by the report of guns at no great distance. Last night I heard reports of heavy guns and got up and dressed myself, and went along a bye-lane leading to the road which runs from Vercelli in the direction of Ivrea, and could distinctly see the flashes of cannon fired from a point I imagined to be about two miles from Vercelli, and pointed in the direction of that place. It did not last long, and no notice was taken of it by the Austrians as far as I could perceive, though a good number of them are camped outside the town. I could see the lights moving about among them, but, considering the distance from which the cannon were fired, none of the balls could have reached them, and the firing must have been out of mere bravado. I have been told this morning that it was a party of Sardinian artillerymen, but, whether Sardinians or French, they have disappeared for the present.

I was interrupted just as I had got thus far in my letter by the arrival of a party of French cavalry in the village. They stopped here to ask the old people some questions, and caught sight of me. As my appearance showed pretty plainly I was not a Piedmontese, the officer, I presume, thought I must be an Austrian, and began to catechise me rather roughly, but the sight of my passport with the *visas* upon it soon satisfied him. There is a striking difference in the manners of the French and Austrian officers, by no means in favour of the former. The latter were quiet, and though sometimes stern in their mode of speaking, there was no arrogant assumption of superiority such as that which I have observed to characterise the generality of the former, and which is so exceedingly offensive to Englishmen. The Frenchman is polite enough to those whose superiority he cannot dispute, but when it comes to dealing with poor people, the true nature of the man peeps out. I was talking to a priest the other day, and he told me that this assumption of superiority had given great offence to the Sardinian officers, by whom the French officers were very generally disliked.

From what I hear from the detachments and the increased frequency with which they appear, I have no doubt that the French and Sardinian troops are collecting in the vicinity in force; and as the Austrian officers told me, and it is common talk among them, that they will not abandon Vercelli, there can be no doubt that a few days will see a battle fought there, which will certainly be a very bloody one, as the Austrians are in considerable force and have strengthened the place very much with earth-works.

I am very much surprised to find how quietly things go on, notwithstanding the excitement which must naturally exist when we can almost see two hostile armies in presence of each other. From what I had read of war I fancied that everybody must live in fear and trembling who happened to be in the vicinity of an hostile army, and so no doubt your readers imagine, but this is not so. I see the people about me get up at daybreak and go out to their work in the fields, as, I suppose, they always have done, and in the evening they assemble at the wineshop, or form a group where the streets cross in the middle of the village, to talk over the chances of the war. Among these assemblages the women are very conspicuous, not only by their numbers but by their volubility. Their opinions are not of much value, of course, but, I must say, they have a very low estimate of the results to be derived from the *Tedeschi* being driven out of Italy, and curse the war in very energetic though a very barbarous kind of Italian. It would be very strange if it were otherwise; most of them have lost more by the invasion than they can recover for a long time; and it is the nature of man to feel more acutely his own material losses than any imaginary grievances under which men with whom he has no connection may happen to labour. I must confess that I entertain their views to a great extent, although I look upon the war and the results it may lead to with greater knowledge of the subject than they possess. "What," I have heard them ask, "have we, Sardinians, to do with freeing the Italians? We are overwhelmed with taxes ourselves. We have nothing to gain by war, while we lose everything, even our children. If the Emperor of France wanted to give the Italians liberty, why didn't he do it himself, without drawing us into the matter? The French say they are more than a match for the Austrians, so they did not want our help." Such is the kind of language I hear everywhere about here. Possibly it may be different in Turin, where the people are far removed from requisitions and so forth. Before I came here I used to hear it said, and to read in newspapers, that the Sardinians were most enthusiastic on the subject of war; but I suspect now that the enthusiasm was confined to the people about the court, and the press which they inspired. The latter being perhaps the most unprincipled press of any State in Europe; making statements, which it knows to be false, at the bidding of this or that individual. As an illustration of the reliance that may be placed on assertions made by the Turin newspapers, I will just mention a fact which may place your readers on their guard in future. It was stated in the Turin newspapers, and among others, in the *Piedmontese Gazette*, that Count Cavour's reception on his return to Turin was of the most enthusiastic kind; that he was publicly serenaded, and that a magnificent procession, with lighted torches, marched to his house, &c. Now, I have been told by a priest and two other persons since I came here, that the whole thing was a farce, and was a most ridiculous affair from beginning to end. These persons assured me they were present and saw it, and I have no doubt whatever that they told me the truth. The fact is, the Turin newspapers are mostly conducted by foreigners, who have their own purposes to serve.

All this is not very photographic, is it? but photographers are men, and have the same interest in learning what is going on in the world as others; and if what I have heard be true, that no newspaper correspondents are to be allowed to travel in Piedmont, they will thank me for writing and you for publishing my letters. Besides what I have been told, I can see signs myself of something important being about to take place, the Austrians are hurrying towards Vercelli from different points. . . . .

J. L.

A NEW DRY COLLODION PROCESS.

BY P. C. DUCHOCHOIS.

All the preservatives for the dry sensitive collodion film have some defects too well known to be described again. The principal of them is certainly to destroy to some extent the sensitiveness of the plate. I believe that the process I have the honour to communicate retains better all the sensitiveness of dry preparations, and gives more easily a good intensity to the negative, than any other.

The process is:—

1st. Immerse, after washing, the sensitive film in a solution made by boiling three or four hours one pound of liquorice roots in half a gallon of water, evaporating to 30 ounces, adding 3 ounces of alcohol, and filtering—the liquid is used cold.

2d. After exposure, immerse the plate in—

Water	1 ounce.
Nitrate of silver	20 grains.
Acetic acid	5 drops.

This renders the glycyrrhyzine insoluble, and prepares the film for a more even development.

3d. Develop with a saturated solution of gallic acid in water, to which is added, little by little, during the development, a quantity of the above solution of nitrate of silver, which is judged necessary to bring out the impression.

The collodion I use for the dry process is prepared according to the formula I gave some months ago (see "Photographic News," vol. i., p. 233). I have, however, made some modification in it, for the addition of ammonia destroys the properties of pyroxyline to such an extent, that a very thick contractile plain collodion in less than a month becomes very fluid, settles in giving a rotten, horny, and opaque film, which splits in little networks.

These defects are easily prevented by preparing the collodion as follows:—

First, make the collodion with three parts of ether, two parts of alcohol, ¼ minim of ammonia, and 2½ grains of pyroxyline to the ounce. After 4 or 5 hours, neutralise the free ammonia with two drops of hydrobromic acid, then add 3 grains to the ounce of pyroxyline.—*American Journal of Photography.*

PHOTOGRAPHY OF THE PASSIONS.

The circle of the scientific press recently assembled to hear read an interesting paper, by Dr. Malley, on an album of the mechanism of the physiognomy, composed by M. Duchenne.

Our readers are aware that Dr. Duchenne's process of analysis consists in putting the muscles of the face in motion by means of electrical excitement. In order to preserve a record of these expressions, which disappear almost as soon as they appear, the experimentalist had recourse to photography, under the able superintendence of the younger M. Tournachon. The principal points which result from these remarkable researches are as follows:—

There are in the human face grand lines which control the expression of the remainder; the eyebrow is one of these, and certainly the principal one; by its elevation by means of a muscle situated in the forehead, astonishment is depicted, also attention and surprise. For this reason, M. Duchenne calls the frontal muscle the *muscle of surprise.* In this movement, which is that which may be observed on every face in the pit of a theatre at the moment of raising the curtain, the eye uncovers itself as much as possible the better to receive the impression communicated externally. The contrary expression, that is to say, the lowering of the eyebrow, is produced by the superior portion of a muscle which enters into the composition of the two eyelids, which is known by the name of the *orbicular.* Its contraction expresses reflection, and gives a clouded expression of countenance; hence it is termed the *muscle of reflection.* A little muscle situated in the eyebrow is called the *muscle of grief or pain*, because it produces that expression when set in motion. Another muscle, the pyramidal, placed across the root of the nose, seems intended to express viciousness, and its energetic contraction gives an indescribable expression of ferocity to the countenance; it received the name of *muscle of malice.*

Two other muscles, situated on the cheek beside the cheekbone, the great and little zygomatic, control laughing and crying. There are several other muscles whose expressive functions are depicted in the album before us, but as they occupy a less important rank than those we have named, we shall pass them over in silence.

To estimate the degree of influence on the expression exercised by each of these muscles, their contraction was excited in succession at the moment when the countenance was immobile; and to make the experiment more decisive, the face on which all these passions were by turns depicted was that of an old man, and was, moreover, partly paralysed. Contractions were determined which were simple or isolated; these were expressive or inexpressive; then, passing from the simple to the compound, the muscles were made to contract in pairs, or groups of three, compound contractions were thus obtained, which are termed concordant when they express a single passion, and discordant when they have no other result than to produce grimaces. Some muscles, as we have already mentioned, enjoy the exclusive privilege of depicting by their individual action the expression proper to them; their simple contraction, therefore, is completely expressive. This effect was formerly attributed to the simultaneous contraction of several muscles. The researches we are considering demonstrate that this apparent general contraction of the features of the countenance is nothing but an illusion produced by the influence of the lines of the eyebrow and the forehead on the other features, without any other action than a relation of vicinity, such, for instance, as that observed in the case of different colours placed side by side. A fortunate chance led to the meeting with a young man who had accustomed himself to reproduce, with great art, on his physiognomy the various expressions of grief, anger, surprise, &c.; this enabled the experimentalist to compare the effects of electricity with those of the mind. In each study care was taken, in the first place, not to excite more than one side of the face, the other being left immobile; so that, by acting upon them alternately, it was easy to judge of the change effected in the general appearance of the face under examination.

It is, as will be seen, a kind of living anatomy, the anatomy of the nude, as artists term it, which will have a powerful influence on art, dissection, and physiology.

Some of the muscles of the face were very little known; putting them in motion by means of electricity has allowed of their being isolated. The pyramidal and the superior part of the orbicular of the eyelids are among these. Physiology ought, naturally, to acquire from these researches a more perfect knowledge of the function of the muscles, and of the nervous branches which lead to them. As to art, it is easy to see the advantages it may derive from photographs of the passions so truthfully represented. To render our most secret emotions and passions with as much delicacy as vigour, it is necessary to know what organs nature employs to express them. The artist who is wanting in this knowledge commits a fault against the mute language of the passions; to depict correctly, he ought, therefore, to know exactly the laws of the expressive movements, the *ensemble* of which constitutes the mechanism of the physiognomy.—*L'Ami des Sciences.*

Critical Notices.

Photographs at the Handel Festival.—NEGRETTI AND ZAMBRA, Hatton Garden.

THAT the Handel Festival, which formed the staple of the conversation at every dinner party in London for several days, should have passed by without being recorded photographically, would have reflected discredit on our art. To give a truthful picture of such fleeting scenes as these is one of the chief advantages of photography, and such an occasion as that referred to above was not allowed to pass without its services being called into requisition.

Those who were present will remember the precaution taken to exclude the sunlight from the orchestra—a precaution which, however much it added to the comfort of the audience, by no means facilitated the operations of Messrs. Negretti and Zambra, of Hatton Garden, who are the photographers attached to the Crystal Palace—especially as the awning was formed of a yellow-coloured waterproof material, and as the roof of the transept itself is covered with calico: the glass of the roof itself, moreover, being of a peculiar tinge not at all favourable to photographic operations; thus rendering necessary an exposure ten times longer in duration than would be required in an ordinary glass room. We do not enumerate these drawbacks to excuse the pictures obtained under these conditions, but to show what skilful photographers can accomplish under adverse circumstances. The pictures were taken from the organ loft, the first on Saturday, the day of the rehearsal; the second on Wednesday, when the "Messiah" was given; and a third on Friday, when the attendance to hear "Israel in Egypt" was even greater than on the previous days. If the print taken on Wednesday may be taken as a specimen of those taken on the other days, which we have not yet seen, they are undoubtedly good. By looking at the faces with a suitable magnifying glass it is not difficult to recognise those with which we are acquainted, and in this respect the print is far better than that taken on the occasion of Her Majesty visiting the Crystal Palace with the Emperor and Empress of France.

The Photographic Art: its Theory and Practice.—Revised by JAMES MARTIN. London: Houlston and Wright.

It cannot often be made a charge against writers that they give the public too much for their money, and such a charge would apply less to writers on photography than to any others; but this complaint might be made with justice of the book bearing the above title. It is true, it does not profess to be an original work, and might be designated the reprint of a reprint—the work having been compiled in the first instance by Mr. Sparling, and revised and corrected by the present editor, which no doubt may account for the liberality as regards the quantity of matter. To review a book, which is little more than a series of extracts, is a somewhat difficult matter, the only opening offered for criticism being the judgment with which those extracts have been made. In the case of the book before us, the editor has avoided laying himself open to the charge of having omitted much valuable information; but, in selecting that which is really valuable, he has mixed up with it a good deal which might very well have been dispensed with.

With few exceptions, which we are not disposed to look upon as of very great importance, the book, as we have already observed, does not err on the score of containing too little; on the contrary, the value it would otherwise have possessed is greatly reduced by the copiousness of the extracts, page after page being in some cases occupied in treating of a process which could have been as completely described in a very small compass; to the confusion of the beginner—for whom alone the book is intended—who, by reading so much, is at a loss which particular process to follow, and who, probably, ends by following neither implicitly.

It is, however, so much more agreeable to praise than to blame, that we have looked carefully through the book in the hope of discovering something original, which might justify us in recommending it to our readers, and at last we succeeded in discovering a paragraph commencing "The Author's Process." There is nothing to be said against this portion of the book as far as it goes; nay, it may fairly lay claim to the merit (wanting in other portions of the book) of extreme brevity, for including an elaborate description of an operating room, with a plan on a pretty large scale, it occupies little more than four pages; this can hardly be considered sufficient to entitle the work to a high place in photographic literature.

The best written and most complete portion of the book is devoted to a branch of photography now but little practised, namely, the daguerreotype process. The description of the manipulations, and the apparatus required, is most elaborate, and any person wishing to practise this process could not do better than purchase the book. We may almost say the same of that portion devoted to the optics of photography, which is both clearly and concisely written. His directions on the score of the necessity of extreme cleanliness we entirely endorse; and we have ourselves lost no opportunity of urging this point, although it never occurred to us to suppose that any of our readers required instructions on this score like the individual who Mr. Martin says was constantly in the habit of writing to him to complain of failures, until he at last became tired of hearing them, and determined on paying him a visit to see the reason. He says:—"He commenced in a first-rate style of activity, took up a glass plate, picked up a piece of old linen that was lying on the developing bench in his dark room, with which he polished his glass, coated it, and plunged it in the bath. He then proceeded to arrange and focus me; he had a curtain over a beam, for the purpose of shading one side of the face; and, in his usual energetic manner, he gave this curtain a pull, in order that he might place it where he wished, and drew it suddenly along the beam (which I am sure had a month's dust upon it), and set a cloud floating about the room that would take at least three hours to clear away. He then put the plate in the camera, and, after exposing, he took up the glass holding the developing solution from out of a mess of wet, &c.; and in pouring the developing solution on to the plate, he let a couple of drops fall on the latter from the bottom of the developing glass, furnished by some of the indescribable mess in which it had been standing. Considering this, and also that the atmosphere in which the plate was taken out of the bath was saturated with dust, and the state of the interior of the camera in which it was exposed, recollecting at the same time that the cloth with which he wiped the glass was taken off the sloppy bench, it is not to be wondered at that the resulting negative was somewhat similar to the first effort of a schoolboy in drawing a portrait over which he subsequently upset his ink. 'There, sir,' said he, 'how do you account for that?' Wishing to see if he would go on again in the same way, I said, 'Well, I scarcely know; try again.' Everything was repeated exactly as in the first instance, with this addition—he actually washed his glass in the water which had just washed the hyposulphite of soda off his last picture." We trust that Mr. Martin succeeded in convincing his pupil of the enormity of his trangressions, and bringing him to a due sense of what is required of those who enter upon the practice of photography.

In turning over the leaves of the book we alighted upon a section headed "On the Fading of Positive Proofs." Wishing to see what the editor had to say on this important point, we redoubled our attention, and were rewarded by reading the following extract—from whence derived is not stated:—"This matter has of late become of such importance that the Council of the Photographic Society decided a few months since upon appointing a committee, of which the writer has the honour of being a member, to examine and report upon it. The experiments required in order to be decisive, must necessarily extend over a long period of time, and it will be many months before the results can be fully known. The proofs which fade most frequently are those which have been fixed and also toned. It is this part of the process, so necessary to the artistic effect, which increases the danger." We had a dim recollection of such a committee as that referred to having been appointed some years ago, and of their having made a report on the subject now almost or quite forgotten; but we had no idea that any such committee was in existence at the present day, and it was not until we referred to the title-page, and found it to bear the date of 1859, that we were satisfied that we had not been examining a book of old date. Who the writer may be who ascribes an increased tendency in prints to fade after toning we know not; but he must have studied the question to little purpose seriously to entertain such an idea. Recent experiments have shown that the best guarantee for the permanency of silver prints is in the toning by means of salts of gold; and also that prints so toned, which have no inherent fault from careless manipulation, are, to all intents and purposes, permanent. As regards the cause of the alteration of photographic prints, there can be no doubt that it is due to the combined action of sulphur and humidity. In proof of this we may cite the experiments made by Messrs. Davanne and Girard, which was detailed in the Report of the Committee of the French Photographic Society.

In conclusion, we may observe that the objection we hinted at, as tending to lessen the value of the book before us, on the ground of the too great copiousness of the extracts of which it is composed, is to a certain extent mitigated by the addition of an excellent index, which renders the work of use as one of reference. Whether there can be any justification for a person compiling a volume, consisting of the more valuable portions of works which have cost the authors much labour and money, is a matter into which we will not enter. It is true that, in the case of one gentleman, whose work has been laid under contribution to a very considerable extent, the editor asserts that he had express permission; but such permission, we presume, can only be fairly granted by the author when he retains the possession of the work, and has not sold the copyright to the publisher.

The Pocket Stereoscopic Camera.

WHO has not seen in country cottages a great printed broadsheet, with a highly coloured wood-cut at the top, showing Robert Nixon, the prophet, in the act of cruelly goading and otherwise ill-treating his brother's oxen; and replying to the reproaches of his brother by predicting that they would not be his by that hour to-morrow—a prediction verified to the letter, for they were seized the next morning for unpaid church-rates; this literal fulfilment of his prediction establishing his reputation as a prophet for ever after—a reputation which it must be allowed was very cheaply obtained. But those were days when it was not necessary for a man to be capable of setting the Thames on fire to prove his title to be believed when he hazarded a speculation. Moreover the bucolic mind has always been peculiarly susceptible of receiving extraordinary statements, hence it firmly believes that the day will come when a farmer may carry sufficient manure for a ten acre field in his waistcoat pocket. The individual who uttered this latter prediction must have been a bold man—almost as bold as the photographer who not long since solemnly prophesied that the time was very near when we should wear our cameras on our heads, with the lens to serve as a ventilator, and so go forth with a pocket full of dry plates in search of the picturesque. We fear, however, that the maker of photographic apparatus has not yet arisen capable of producing such a very portable camera: nor, indeed, is it of much importance, if he delays to make his appearance for an indefinite period, inasmuch as a camera has been made which is to all intents and purposes what it professes to be—a pocket camera, or, as it is less briefly styled in our advertisement pages, "The Pocket Stereoscopic Camera."

This camera at first sight appears like a toy. We cannot persuade ourselves that the tiny apparatus before us is capable of being used in the serious business of photography, measuring as it does only two inches in depth, eight inches in length by four and three quarters in width; it is only on erecting the sides, and placing the front board in its place that we are convinced that we have a camera capable of taking stereoscopic pictures of the ordinary size, and possessing every quality ordinarily found in such cameras. It carries only a single lens, and is so constructed that pictures may be taken at an angle of 6 inches, which is the maximum, and, of course, at any angle within that limit. The arrangement for altering the angle is of the simplest description, and yet at the same time the most perfect imaginable; a mere touch of the finger sufficing to move the camera to the desired position with unerring accuracy: in fact, it is a perfect gem of its kind.

As regards its portability, our readers may judge of that from the dimensions we have given above, especially when we add that, including the focussing glass and dark slide, the entire apparatus weighs but 19 ounces, and can be dropped into a coat pocket with perfect ease.

Dictionary of Photography.

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DISINTEGRATION, or pulverisation, is the act of reducing solid bodies to powder. Photographers should only use the pestles and mortars made of good Wedgewood ware, except, indeed, they are willing to go to the expense of one of agate. Glass mortars are very liable to break, marble is too soft, and iron, steel, or brass mortars are liable to introduce impurities into the solutions, either from mechanical abrasion of the surface or chemical action of the substance being powdered upon the metal. The operator should endeavour to reduce bodies to powder by a circular grinding movement of the pestle against the lower part of the mortar—only resorting to blows when the lumps are too large, or hard, to admit of that treatment. In striking a hard lump of any substance (cyanide of potassium, for instance), in order to reduce it to powder, there is great danger of causing some of the fragments to fly about the room; this may be, in great measure, avoided by placing the lump in the centre of the mortar and striking straight down on it, holding the pestle vertical. In some cases it will be found advantageous to wrap the lump very loosely in paper, or a cloth, and give it two or three sharp blows with a hammer on a stone, before attempting to pulverise it in a mortar; this plan must, however, not be attempted with substances of much value, or with those that are to serve for delicate photographic work, as some of the small particles cannot fail to be lost by adhesion to the paper or cloth at the point where the blow is struck, and, conversely, particles of organic matter will always find their way into the substance. In rough experiments, such as in preparing the mixture of *residues* and *flux* for a furnace operation, it will be of great assistance if the contents of the mortar are, from time to time, poured into a sieve, and the coarse fragments returned for repulverisation. A mortar should always be cleaned out after being used. If there be any difficulty in getting it free from the stain of the substance last pulverised, a little coarse sand, ground round once or twice with the pestle, will be found an effectual means of cleansing it.

Distilled Water.—Water that has been converted into vapour by heat, and then condensed by cold into the liquid form again; by this means all the impurities usually met with, being non-volatile, are left behind, and nothing but pure water is found in the receiver. Distilled water being, however, prepared in large quantities, and sometimes in a not very careful manner, should always be tested by the photographer before being used. For this purpose take three perfectly clean wine glasses, and half fill them with the water to be tested; in one add one drop of nitric acid and a small crystal of pure nitrate of silver. If, on stirring well with a glass rod, the solution remains clear, and free from any milkiness, the absence of a chloride may be inferred. In the second glass add one drop of acetic acid and a small crystal of oxalate of ammonia; the absence of turbidity in this case shows the absence of lime, or its salts; and if the third glass remains clear, after adding a drop of nitric acid and a crystal of nitrate of baryta, the absence of sulphuric acid is shown. A sample of water that stands these tests, and is at the same time neutral to test paper, and free from any particular taste or smell, may safely be employed in any photographic experiment.

Double Iodide.—This term is applied to a solution of iodide of silver in iodide of potassium, and is employed in the calotype process for the purpose of saturating the paper with iodide of silver in a fine state of division. It is prepared by taking an ounce of distilled water and dissolving in it fifteen grains of nitrate of silver, then in another ounce of water fifteen grains of iodide of potassium; pour the solutions together and a yellow precipitate of iodide of silver will be formed, and will sink to the bottom; pour off the liquid, but be careful that none of the precipitate be lost; add three or four ounces of rain, or distilled water; stir with a glass rod; let it remain to settle; pour off and repeat this washing. The object of this is to dissolve out the nitrate of potassa which has been formed by double decomposition; the iodine of the iodide of potassium leaves the latter to go to the silver, forming iodide of silver, whilst the nitric acid unites with the potassium forming nitrate of potassa, which latter, being *soluble* in water, is washed away, or nearly so, in these changes of water, whilst the iodide of silver, being insoluble, is left behind. When it is well washed, pour off, carefully, as much water as possible, and then add 140 grains of iodide of potassium, and fill up with water to make one ounce. Probably these 140 grains will not cause all the precipitate to dissolve, in which case add a few grains at a time, until the whole of the iodide of silver is dissolved, and the solution becomes clear. This solution has the property of precipitating iodide of silver from it when diluted with water; and if it be brushed over a sheet of photographic paper, and when nearly dry dipped into water and well washed, the iodide of silver will be precipitated in an extremely fine state of division in the pores of the paper. For further particulars see the articles on the calotype process in our first volume.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

The specific injurious action of gutta percha vessels on photographic solutions has rarely been stated. The general fact, however, that nitrate of silver solutions kept in such vessels have been spoiled has been reiterated so often that there can be no doubt of the fact. A like charge regarding the effect of gutta percha on acetic acid has also been made. The important consideration is to discover the sources of such injurious action, to detect their presence, and, where it is possible, remove them. It appears tolerably certain that no chemical action on the solutions in question is produced by pure gutta percha. It has been alleged against this view that gums and resins *do* precipitate nitrate of silver. But gutta percha, strictly speaking, is neither a gum nor a resin, and is in most of its properties widely different from either. The fact, moreover, that gutta percha vessels have been used for years for nitrate of silver with impunity, points with sufficient force to adulterations as the cause of injuries which have taken place. These impurities, we have little doubt, consist, in all cases of foreign matter, in mechanical combination, either the result of want of care or fraudulent economy in the manufacture. The raw material, as it is imported into this country, is not unfrequently mixed with chips of wood, bark, leaves, earth, stones, &c., introduced before the sap has become concrete. All this is, however, carefully eliminated as a preliminary process in the manufacture of the article. The first step is to reduce it into thin shavings by means of a cutting machine; these shavings are then introduced into tanks of boiling water, by maceration in which the grosser impurities are separated, sinking to the bottom of the water. The partially purified gutta percha, now collected into one pasty mass, is then introduced into a box called a "teazer," containing a cylinder studded with jagged teeth. This cylinder, making about eight hundred revolutions in a minute, quickly tears the mass into fine shreds, which fall into a tank of cold water underneath; it is there collected in fine, clean, well washed shreds, all impurities having been removed. Where it is desirable to make assurance doubly sure that not the minutest chip of foreign matter remains, a further process is resorted to: after again being reduced to a plastic mass by boiling, it is forced by steam power through sieves of fine wire gauze, by which the smallest particle of intractable matter is arrested, and the entire purity all passing through perfectly assured. Through all this, however, in getting rid of one class of impurities another danger has been incurred. Gutta percha is porous in structure, and has the property of absorbing a large quantity of the water in which it remains for any length of time *at boiling heat*. As much as 25 per cent. of water has, we believe, been detected in some samples of gutta percha. Here, to the dishonest manufacturer, without further adulteration, is presented a ready means of obtaining bulk and weight without cost, and here, to the photographer, is a pregnant source of injury. Means should be taken, and we believe in honest hands are taken, to get rid of this water. This is effected—we here refer to the process we have seen in operation at the works of the Gutta Percha Company—by means of powerful mastication. After the last boiling, it is introduced into thick strong cylindrical iron boxes called "kneaders;" in these boxes revolve a couple of rollers with irregular screws on their surfaces. The boxes being filled and their lids firmly bolted, the mass of gutta percha is subjected for some time to the masticating process, sufficient pressure and kneading being applied to expel all the water absorbed in boiling, and to reduce the whole to a homogeneous mass of uniform consistency. In this state it is sufficiently plastic for manipulating or fashioning into any form, and should not again be heated to a greater degree than is necessary to insure such plasticity.

Thus much for the impurities of gutta percha, which may be incidental or accidental. There are others, however, more fraudulent in their character, and more injurious in their results; fortunately, however, generally more easily detected by the appearance they impart. As we have before stated, at a temperature of about 250 degrees gutta percha melts, and a great variety of substances for the purpose of adulteration may then be incorporated with it: earthy matters of various kinds, saw-dust, &c.; it is unimportant to specify the various adulterations thus added, they are all sufficient to render the article totally unfit for photographic purposes. Vessels made of such mixtures generally become brittle and useless even for the commonest purposes, possessing the defects of earthenware without any of its advantages. By a very little care in examining, these spurious articles may be detected by their appearance. We will describe two which have recently come under our observation—and we almost wish we had a photographic *index expurgatorius* in which we might insert the manufacturers' names. One, an expensive bath with watertight top, was of a yellowish brown colour, very much mottled in appearance, not unlike in colour and general effect to soft soap solidified, or cakes we have seen of compressed vegetables. This bath, on a very slight pressure with the finger and thumb, cracked with an irregular fracture, such as a piece of pastry might present. It is scarcely necessary to say that pure gutta percha can in no case present such an appearance as we have just described. Another sample, by another maker for photographic purposes, is a large washing tray, which is cracked like a piece of earthenware from a fall. Unlike the other in appearance, this is almost black, very rough, coarse, and *earthy* in appearance, not altogether unlike a dark clay. The appearance of the pure article, as we have said before, is of various shades of a greyish or reddish brown; when cut, presenting a bright, clean edge, homogeneous in texture, free from gritty particles—in no degree brittle. Adulterated samples rarely possess the same bright, homogeneous appearance, but are dull and earthy, or present an appearance of texture, and a mottled effect. They are generally much heavier than the genuine article.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 27th June, 1859.

To the observations placed at the head of my last letter concerning the action of light on salts of silver after this light has been made to pass through different substances, I will now add a few facts published four years after the experiments of Professor Hessler, by M. Malagutti, and recorded in M. l'Abbé Moigno's *Repertoire d'Optique Moderne* (Tome ii., p. 796).

M. Malagutti has shown in the most evident manner that liquid screens have a very marked effect upon the chemical properties of light which has passed through them. In order to judge to what extent this action takes place for different substances, he made some standard papers coloured by matters on which light has no action, and placed them against the chemical papers used in the experiments.

The standard or test papers of fixed colours were tinted with a mixture of carbonate of lead (*white lead*), Indian ink, and garance-laque, suspended in a mucilaginous liquid. The chemical or sensitive paper was prepared by plunging a sheet of paper first into anhydrous alcohol slightly acidulated with hydrochloric acid; when dry, it was placed in a weak solution of neutral nitrate of silver, and afterwards dried in the dark.

In performing the experiments, the sensitive paper was placed, together with the standard paper, in the focus of a camera obscura; and to assure himself that light is modified chemically by the different substances through which it passes, care was taken to place a piece of sensitive paper below the screen or solution on which M. Malagutti experimented, besides the piece placed behind this screen. Each experiment was continued until the sensitive paper had acquired, by the action of the light which passed through the substance examined, the same tint as that on the standard or test paper. The time which elapsed before the sensitive paper acquired this tint was carefully noted.

Here are some results obtained. The numbers express the relation existing between the time employed for the several substances named, air being taken as unity:—Air, 1·00; distilled water, 0·75; hydrochloric acid, 1·23; nitric acid, 1·48; essence of turpentine, 2·05; essence of citron, 2·85; essence of lavender, 3·14; creosote, 3·95. It would not, therefore, be very difficult to distinguish these several substances by photographic means. Absolute alcohol, wood-spirit, naphtha, ether, sulphuric acid, crystallisable acetic acid, and a few other substances, had no action at all, and would, consequently, be readily distinguished from the former.

We see by the above figures that instead of delaying the chemical action of light, as is remarked in the other substances, pure water evidently accelerates it.

In one of the late meetings of the *Academy of Sciences*, at Vienna, M. de Perger presented a few practical details "*On the Photographic Sensitiveness of Asphalt.*" After discussing the use of bi-chromate of potash, gum, and charcoal, according to Mr. Pouncey's method, M. de Perger remarked that he had observed some years ago that asphalte, spread in thin layers on metallic plates finely polished, showed itself sensitive to the action of light, and that he had, at that period, endeavoured to employ this substance photographically. He did not, however, employ the asphalt in its rough state, but the purer product obtained by distilling commercial asphalt. He obtained excellent results on metal, on paper, and on lithographic stone. The first essay made with a view of multiplying asphalt images (obtained photographically) by means of a lithographic press, appear to promise great success for the future.

M. Schlossberger, professor in the University of Tubingen, has lately made known the following facts relative to the dissolution of cellulose, &c., by Sweitzer's ammoniacal solution of copper. This cupro-ammoniacal liquid dissolves, as is well known, cellulose and silk. M. Schlossberger has found that an ammoniacal solution of oxide of nickel possesses, with regard to *silk*, the same property as the copper liquid, except that whilst the dissolution of silk in the latter does not alter the blue colour of the solution, the nickel liquid changes colour and becomes of a yellowish brown.

According to the same author, the cupro-ammoniacal liquid has no action on gum or dextrine, but dissolves perfectly filtering paper (which may be considered as impure cellulose). Many salts, and especially solutions of alkaline salts, precipitate this dissolution; the precipitate thus formed offers not a trace of organisation, or of crystallisation. On analysis it gives precisely the composition of cellulose.

The same re-agents (alkaline salts) do not precipitate silk from its solution in the cupro-ammoniacal liquid. Here, then, we have a method for separating silk from cotton. A second process by which the same separation may be effected, consists in employing the nickel solution instead of the copper one; the former having no action on cellulose, but easily dissolving silk.

M. Schlossberger concludes his remarks by stating that a dissolution of cellulose in the cupro-ammoniacal liquid is likewise precipitated by alcohol, by a concentrated dissolution of honey, gum, or dextrine; and that the cupro-ammoniacal liquid has no action on gun-cotton or collodion.

M. Volpicelli, an indefatigable Italian physicist, has just made known, in a letter to M. Despretz, of the French Institute, a curious circumstance connected with the development of electricity by friction:—The first finger and thumb of one hand being covered with a woollen glove, or any other tissue, a small stick of Spanish wax (*cire d'Espagne*), or of resine-laque, is held in the other. If the wax be now submitted to a strong friction against the glove, it is found to develop *positive* electricity; if the friction is feeble, *negative* electricity is developed. These remarkable phenomena may be repeated as often as the experimentalist desires, a weak friction always producing negative electricity, and a strong friction positive electricity. In the passage from one of these states to the other, neutral electricity is met with.

Now, if a stick of wax a yard long is rubbed violently with a woollen cloth, it is found to be charged with *negative* electricity on its entire surface; but if a few slight passes are then performed upon this stick of wax with the woollen cloth, the wax becomes positive at one end, and remains negative at the other.

These seemingly paradoxical phenomena, which M. Volpicelli includes under the term *static-polarity*, are likewise observed when glass is acted upon instead of resin or wax; they are also seen with calc-spar, selenite, &c., and do not appear to be connected with the difference of temperatures produced by different degrees of friction, but, according to M. Volpicelli, with the difference in the *quantities of movement* employed in one case and in the other. These experiments are extremely interesting, they may be added to those which tend to confirm the beautiful theory of the *correlation of forces* developed in so masterly a style by Mr. Grove. I would much like to see them repeated by my esteemed friend, Professor Thomson, of Glasgow.

Many attempts have been made to form an amalgam of aluminium, but without success. The mercury could not be made to adhere to the former metal. M. Tessier has found that if the aluminium be previously rubbed with a solution of potash of soda, mercury will unite and form an amalgam. But the latter is quite useless, for by this experiment a sort of galvanic pile is formed, and the aluminium becomes as electro-positive as calcium or barium, becoming quickly oxydised on exposure to air, decomposing water rapidly, &c.

A work on mathematics, by Mr. George Salmon, fellow and tutor of Trinity College, Dublin, has been forwarded by the author to the Paris Academy of Sciences. This work, entitled "Lessons Introductory to the Modern Higher Algebra," has been very well spoken of here by certain distinguished mathematicians.

M. Henri Sainte Clare Deville has just analysed cryolite, the mineral from which most of the aluminium now in commerce is extracted. M. Deville's object was to try a new method of analysis, which consists in treating the substance at a high temperature with caustic lime, by which cryolite is entirely transformed into caustic soda, alumina, and fluoride of calcium, substances which are easily separated.

This mineral, to which Henri Rose formerly called attention, as being a profitable substance for the manufacture of aluminium, is a natural fluoride of aluminium and sodium; M. Deville's analysis confirms that of H. Rose. He finds:—

	Theory.	Experiment.
Aluminium	13	.... 12·8
Sodium	32·5	.... 31·8
Fluorine	54·5	.... 55·4
	100·0	100·0

Cryolite contains no potash, but, strange to say, in some specimens a slight quantity of phosphoric acid is found. This explains a curious phenomenon, observed lately by M. Morin, at Nanterre, near Paris, where a laboratory for the production of aluminium is in activity; M. Morin observed that as soon as the chlorine gas enters the heated tubes containing a mixture of alumina, chloride of sodium or coal (producing volatile chloride of aluminium, which is afterwards decomposed by sodium), a notable quantity of phosphorus is volatilised and received in the condensing apparatus.

J. Steenstrup, a well-known and distinguished naturalist, has published some interesting observations concerning the tape-worm of the little prickly fish that inhabits our streams and canals, called by the English *stickleback* (*Gasterosteus aculeatus*, and another species *G. pungitius*). The worm which inhabits these tiny fish is called *Schistocephalus solidus*; it does not inhabit their intestinal canal, but their abdominal cavity. On the contrary, this worm is often to be found in the intestinal canal of aquatic birds, whence it was concluded that the birds infected themselves by eating the fish, and the fact appeared to be proved by an experiment made by Abildgaard, who caused some ducks to be fed with sticklebacks known to carry the parasite in question, when the ducks soon became infected themselves. Steenstrup has shown, however, that the fish is not eaten by the birds (a kind of nutrition that would be dangerous to them on account of the spines on the fish's body), but the worms themselves, which, having acquired all the development of which they are capable in the body of the stickleback, pierce through the abdominal cavity of the fish, leave him completely, and crawl freely at the bottom of the water. The sticklebacks do not survive the wound thus produced. They die without exception soon after the parasitical worm has made his exit. The fact appears to have been suspected as early as 1825, by Baer, who found some *Shistocephali* alive and free in the water, not far from the bodies of some dead sticklebacks, whose abdomen had been pierced in the way described.

Steenstrup remarks, also, that some other kinds of worms, namely those *larvæ* or incompletely developed individuals called *Ligula* (which, like the *Shistocephali*, belong to the cestoid group), which likewise inhabit the abdominal cavity of fish, perforate these parts at a certain period of their existence to come out and live freely in the water.

Photographic Societies.

BLACKHEATH PHOTOGRAPHIC SOCIETY.

A meeting of the above society was held on the 20th ult.; the President, J. Glaisher, Esq., F.R.S., in the chair.

After the usual business had been transacted, Messrs. Henry Kent, Newton Crossland, Thomas Skaife, and William Kieser, were duly elected members of the Society.

Mr. Heisch exhibited two dry plates, one prepared by Hill Norris, the other by himself, by the meta-gelatine process; both had been kept so long that a dirty deposit formed during development. On the plate prepared by himself this was entirely removed by gentle friction with a pad of wet cotton: on attempting to do the same with Norris's plate, the whole picture came off in powder; but the point to which he called the attention of the Society was this, that the glass was still entirely covered with a transparent film. This film resisted the action of a mixture of ether and alcohol, but was removed at once by hot water; it was apparently a coat of gelatine. The question is, does Dr. Norris coat his plates with gelatine before collodionising, as has been lately so much recommended, or is his collodion so powdery as to let enough gelatine through to form this film? Mr. H. thought the former supposition much the most probable. Mr. H. also exhibited one of Derogy's lenses and the pictures taken with it, which were of the most satisfactory description.

Mr. T. R. Wheeler delivered a short paper upon Monkhoven's cellulose process, as recently employed by him; and exhibited a picture taken by it, as well as some prints from that picture. He adverted to the discovery of Schweitzer, of Zurich, that cotton and silk were soluble in cupro-ammonium, and to that of Pelouze as to the solubility of cotton in concentrated hydrochloric acid, and to the application of that discovery by Peligot, while Monkhoven of Ghent had collated what was previously known on the subject, so that the process was not unfairly named "Monkhoven's Process."

The author stated that the object of the several methods in which the ammoniacal solution of copper is employed is the same, viz., to obtain a solution of oxide of copper in ammonia. Monkhoven's plan was to throw down hydrated oxide of copper from commercial sulphate by liquor potassæ, and dissolve it thus obtained in liquor ammonia. Peligot's plan amounted to the same thing, and was the one he (the author) employed.

It consisted in placing copper turnings in a funnel in which some pounded glass was put, and pouring liquor ammoniæ upon it. The air oxidised the copper, and the ammonia dissolved it as fast as formed. The solution, which should be passed and repassed through the copper turnings that it may be saturated with oxide of copper, is allowed to stand, that all impurities may subside, and is then decanted. Carded cotton is then introduced in the proportion of about two parts to every twenty of the solution; it readily forms a viscid solution, and, that being complete, it is ready for use. Iodide of potassium is added dissolved in water in about the proportion of 2½ grains to the ounce.

If well prepared, it is perfectly transparent, of a deep blue colour, and flows readily upon the surface of glass.

When employed as a photographic medium, it is poured as a film like collodion, and allowed like it to set, which is known by a whitish opalescent margin appearing; this occurs, of course, at varying intervals, on account of the varying state of the temperature and its hygrometric condition, but an average time is half a minute; it is then immersed in a bath consisting of water, 100 parts; nitrate of silver, 10 parts; acetic acid (glacial), 5 parts. A few seconds' immersion is sufficient. The surface of the film whitens, and should have a homogeneous texture. It is then exposed in the usual way, and, according to the author's experiments, requires rather a longer exposure than collodion, say 30 seconds. It is then developed. For this the author used—pyrogallic acid, 1½ grains; water, 1 ounce; acetic acid, 10 minims, washed and fixed with hyposulphite of soda. The picture obtained is in many respects a good one, and the process, generally speaking, one of much promise.

The advantages enumerated are its great cheapness, its facility, its uniformity of composition, and the fact that commercial nitrate of silver may be employed for the wash; also its remaining moist in very hot weather, and that it may be kept in the air many seconds before immersion. Its principal disadvantage—and it is that with which the author had principally to contend—is that the film is liable to become detached when immersed in the nitrate bath. It remains to be shown why this so frequently, and apparently so capriciously, occurs; the author believes it to be due to the energetic chemical action which takes place between the ammonia of the cotton solution and the acetic acid of the bath, which is required to be in excess to dissolve excess of copper. He intends making experiments on the subject with a hope of obviating the difficulty, as also to employ the "cellulose" as a dry process. With respect to failure, those accustomed to chemical manipulations will easily understand how hard it is to pronounce wherein it lies, since much disappointment must be encountered, and much inductive experiment used before success is attained. What becomes of the copper? The author believes that it, with the cotton in solution, acts as a base to a radicle in the first instance, and that excess is removed by the acetic acid as a diacetate. The author apologised for the hasty and imperfect manner in which his remarks were conveyed, but hoped to renew the subject with more effect and better success during the ensuing session.

At the conclusion a vote of thanks was tendered to Mr. Wheeler, and the meeting separated.

The First Photographer.—Far away in the dim perspective of the past—so far, and in such obscurity, that the telescope of history has scarcely been able to penetrate deeper than sufficed to record the bare fact—lived a discoverer. Seated in his laboratory, surrounded by conventional alembics, retorts, and other strange-looking chemical apparatus, an alchemist is examining, with excited interest, a product which his furnace has lately bestowed upon him. Hope beams from that face, furrowed by nights of study and days of disappointment, and as his trembling fingers turn the opalescent fragment beneath his eyes, he imagines that he has just effected a great stride towards the attainment of the object of his life, and that the mystery which surrounded the philosopher's stone was, at length, yielding to his research and assiduity. He has just discovered how to convert silver into something quite different from itself. All that remains is to reverse the result, and the transmutation of metals will become an accomplished fact. And, lo! while he still examines his treasure, a new peculiarity appears. The metal, in its new form, not only darkens upon exposure to daylight, but has become possessed of the singular property of staining the skin of the operator so effectually as to resist the detergent powers of soap and water, or, indeed, of any chemical preparation known at the time. The fact is curious, and he notes it; but it is a fact which does not run in his peculiar groove, a phenomenon which does not promise to lead to the great arcanum. It is worthy only of humbler chemists. Is he not one of the guild of Al Chemia—*The* chemistry, *par excellence?* And he returns to his dreams. Very near to honour, very near to a place among the famous of the earth, was this *savant* of the middle ages, had he but known it; but, alas! for him, though in his graspings after the shadowy unrealities of alchemy, he had stumbled over the keystone of a new science; so feebly glimmered the lamp of knowledge, so dense was the night of ignorance, that, like the headless cock in the fable, who spurned the jewel he had raked from the dunghill, so, with a scant notice of its leading phenomena, did this purblind philosopher consign the germ of photography to a sleep of centuries, which has remained unbroken until within the last eighty years. Little wist that follower of chimeras, as he put away the blackened fragment of what he was pleased to term *horn silver*, and went back to waste his wealth in the pursuit of the philosopher's stone, and his health in seeking after the *elixir vitæ*—that he was even then flinging away the corner-stone of a temple to the sun, more glorious than that of Balbec, at whose wonders generations yet to come would gaze in admiration and astonishment, and whose sacred mysteries would be presided over by all the great in art and science, who should live in an age of civilisation far more advanced than his own.—*Irish Metropolitan Magazine.*

Photographic Notes and Queries.

RETICULATION OF RE-DEVELOPED NEGATIVES.

Sir,—I am a hardworking photographer, and make a point of carefully considering (as well as one with but the most limited knowledge of chemistry can do) any of the phenomena that I meet with in the practice of the art to which I am much attached, in order to make myself as self-reliant as possible, and save the courteous Editor of the "Photographic News" the infliction of "a great number of papers of no use to any one except the"—butterman; but, "having a grievance," I am forced in my extremity to solicit your kind assistance. To the point, then, with your permission, sir. I have been for a considerable time using "the same bath and collodion for positives and negatives," with the *best results*, always obtaining, with one-fifth the exposure I find necessary with the old pyro-developer and negative collodion, negatives than which I can see none better for great opacity without hardness. The method I employed is similar to that recommended by "F. R. C. S.," at p. 95, vol. i., of your useful periodical, excepting that I *never* use nitric acid, and but half the weight of citric acid of that of pyrogallic. But, to my mortification, about three weeks since I found that, upon drying, the surface of my negatives gradually *creped* or became reticulated until they were ruined; I tried several samples of collodion, but all with the same results; the positives are, as usual, good: proving that the effect is produced by the re-developer. I then tried the plan you recommended at p. 59, vol. i., in answer to "M. B.;" still the same *misfortune*, for so I feel, being obliged to revert to the negative process; it is like a regular railway traveller being forced to travel a bad country by stage coach in winter. I should not have written you now, did I not know of several practical men similarly circumstanced. Mr. Hardwich's observations, in your last number, do not seem to apply, as, in order to test the effect of atmospheric changes, I have experimented daily, and although we have had the most variable weather, I find no difference as to the particular phenomenon I mention. If "F. R. C. S." or any of your readers can and will inform me how I may overcome this unpleasant circumstance, I shall feel obliged.

Reticulus.

IMPROVED CAP FOR PHOTOGRAPHIC LENSES.

Sir,—Will you communicate to the knowledge of my brother photographers, through the medium of your valuable "Photographic News," the following description of an improved cap for photographic lenses:—

Take away the ordinary cap of a lens, and put in its place outside a wooden ring (fig. 1), with two small flat hooks, *a*, to prevent fig. 2 from descending any further than its proper place; and, to keep it close to it on this ring, fasten fig. 2 with one screw at *b*; now bear the finger on *a* to lift up *c*; a little velvet should be glued inside the circle *d*. The advantages are:—There is no danger of the cap falling off, and no danger of pulling the lens out of focus. In taking a portrait or a landscape, where there is much foliage, it enables the operator to expose the foliage, or the lower part of the picture, for a sufficient time without injuring the sky, or upper part of the impression.

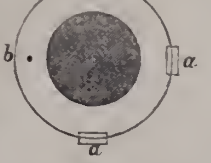

Fig. 1.

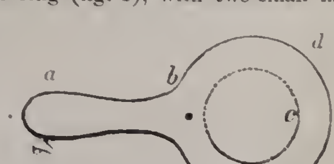

Fig. 2.

It has also great advantage in securing a picture rapidly when no stop is used in the lens, and when accuracy of time is the utmost importance.

N. C.

[illegible]

ANSWERS TO MINOR QUERIES

[illegible]

TO CORRESPONDENTS

[illegible]

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 44.—*July 8, 1859.*

TONING WITH PLATINUM.

BY ALEXANDER WATT.

Several years ago I had an opportunity of proving the truth of the old adage—"Necessity is the mother of invention." I accidentally found myself without any chloride of gold, and having no nitric and hydrochloric acid by me at the time, with which I could have dissolved a piece of gold, and thus overcome my difficulty, I was in what is usually called a "fix"—that species of "fixing process" which photographers care least about. It occurred to me, therefore, to try whether the chloride of platinum would answer the purpose of toning as well as the chloride of gold.

Having by me a strong ethereal solution of the chloride of platinum, I made up a toning bath thus:—

I dissolved four ounces of hyposulphite of soda in eight ounces of water; I then added about 60 drops of the chloride of platinum to an ounce of distilled water, which I then poured into the hypo. solution, gradually stirring all the time, in the same way that the gold is treated when making a gold toning bath. The platinum readily entered into combination with the hypo., forming a clear solution.

I now took an over-printed proof, and immersed it in the bath, and to my great astonishment and delight, the proof, in the course of a minute or two, assumed a beautiful dark brown colour, superior in tone to any shade of brown I have ever known to be produced in a gold toning bath. It appeared to me that in two minutes the proof had acquired the maximum of coloration, for on allowing it to remain for a much longer period no apparent alteration took place. In some instances, where the proof had not been much over printed, the toning seemed almost instantaneous.

Having used Sutton's toning bath a good deal at that time, it occurred to me to make a bath, after his formula, substituting platinum for gold: and, after having well washed some proofs, as directed by him, in the process referred to, I plunged them into the newly-made platinum bath, which consisted of—

Solution of chloride of platinum, about...	30 drops.
Hyposulphite of soda	3 grains.
Hydrochloric acid...	5 minims.
Water	4 ounces.

I dissolved the hypo. in 3 ounces of the water, and dropped the chloride of platinum into one ounce of the water (this should be distilled water). I then carefully added the platinum solution to the hypo., well stirring. Lastly, I added the hydrochloric acid.

Instantly the proofs assumed a rich and brilliant brown colour, of a beautiful tone. I then fixed the proofs in a strong solution of hypo. and the whites became at once perfectly clear, whilst the general tone of the proofs did not, as far as I can remember, undergo any evident alteration.

After having made repeated experiments with the platinum toning bath referred to, in various ways, I felt quite satisfied that with this bath it is possible to obtain brown tones far more beautiful than any shades of brown which can be obtained in a gold bath.

I did not find that by leaving the proofs for any longer period in the platinum bath, the tone would alter from brown to the shades of purple or black, as in the gold bath, and I am inclined to think that such would not be the case.

I have been desirous of conducting these experiments again, with a view to lay before the photographic world some *quantitative* data, which would prove whether or not the platinum bath is more economical in use than that prepared with gold. My impression is that with care, and by using a bath soon after it is made *until it is fairly worked out*, it will prove to be an inexpensive one to work, especially if photographers make their own chloride of platinum.

Amongst the many experiments which I made with platinum was the following:—

In the place of hypo. I employed a few grains of cyanide of potassium in the new toning bath, and I have a proof by me which I took from the pressure-frame, toned and washed it in several waters (one water being warm), ten minutes altogether, and this proof has been exposed more or less to the influences of the atmosphere and light ever since, without apparently having undergone any change. This was done fully three years ago.

After observing, practically, the effects which the platinum produced upon the reduced chloride of silver on the proofs, I began to reflect a little upon the theory of the subject, and the following deductions occurred to me at the time.

I had for some years observed that when an ethereal solution of chloride of platinum was placed in contact with a surface of silver, it immediately darkened the surface, and, as the ether evaporated, a film of reduced platinum was deposited upon the silver, which would attach itself so firmly that it would require good hard rubbing—although the layer was necessarily exceedingly thin—to remove it. This, I argued, would favour the permanency of proofs toned with platinum, for in these we have a silver surface, to which, in the process of toning, the platinum attaches itself. Now, as platinum is, of all metals, the least likely to be affected by atmospheric influence, or by light, or even by any hypo. which may be left in the paper from under-washing the proof, I think that proofs toned by it will be more likely to be permanent than others toned in any way. Of course this is merely an opinion. I acknowledge that I have not yet sufficiently tested the peculiarities of the process, owing to the fact that my time has generally been most fully occupied when I had the greatest desire to renew my researches.

If any of your numerous readers should feel disposed to try the platinum toning bath, I should recommend them to proceed thus:—Owing to the quickness with which the bath tones, it would be advisable, I think, either to wash the proofs first, or to fix them in a plain hypo. bath, 4 ounces to 8 ounces of water, and then to wash them a little before placing them in the toning bath, when I have no doubt the tone will be acquired almost immediately after immersion. But this, I believe, will depend upon the amount of platinum in the bath; therefore, when time is an object, I would recommend employing plenty of the chloride, which, although it will augment the speed of the operation, will not involve much greater cost, for I do not conceive that the reduced silver upon the surface of the proof is capable of attracting, if I may use the term, more than a certain quantity of the metal from the toning bath, whether it remains in the bath up to the time that the picture is toned, or for a week afterwards.

About two years ago, I called Mr. George Knight's attention to this new toning bath, but I have not yet had an opportunity of hearing what success he met with.

Should any of your readers turn their attention to this subject, I shall be most anxious to hear the results of their labours, and I do hope that they may derive some advantage from the process, which, with a little care, I have no doubt they will do.

In conclusion, I may remark that I had intended long since to have made known the above process, but other matters have prevented me from doing so.

PHOTOGRAPHIC COPYRIGHT.

ON the subject of Photographic Copyright there has been recently a most important case decided, and the following able remarks on the subject we extract from the *Athenæum*, as they may not prove uninteresting to our readers:—

THE DEATH OF CHATTERTON.

AN important and interesting trial of copyright in the Rolls Court, Dublin, came to a second hearing on Wednesday, last week, in which Mr. Wallis's picture of "The Death of Chatterton" played the principal part. The facts, as stated in the petition and by the counsel, were these:—

The original painting was first exhibited at the Royal Exhibition of Arts, in London, in the year 1856. It was purchased by Mr. Augustus Leopold Egg from the artist. There was an agreement whereby Mr. Egg sold to Mr. Turner the right to engrave the picture, with liberty to exhibit it for the purpose of obtaining subscribers. The only permitted publication of the engraving of the picture was in the *National Magazine.* In the month of April the picture was carried over to Dublin to be exhibited. The picture was known as "The Death of Chatterton," and so entitled by Mr. Turner. Now, this title was assumed by Mr. Robinson, a dealer in photographs, and an advertisement published by him stated that he would have "the beautiful stereoscopic figure of the last moments of Chatterton" ready for sale on the following Monday. Mr. Turner, believing that such an advertisement would injure his property, applied to Mr. Robinson to discontinue the sale. Mr. Robinson refused to stop his publication, on the ground that his stereogram was not copied from Mr. Wallis's picture, but was an independent study from the biography of Chatterton. Hence the application to the Rolls Court for an injunction to restrain. At the first hearing, which took place in May, the injunction was granted, Mr. Robinson submitting until an affidavit could be framed. He came before the Court with an affidavit, stating that it is impossible to take pictures for stereoscopic slides from a plain surface such as a picture. Last week he also affirmed that in March of the present year he made arrangements for a series of stereoscopic pictures, illustrating the life of Chatterton, such as his Meditations in the Muniment-room of St. Mary's, Redcliffe, writing his last letter to Walpole, &c. The series was completed, with the exception of Chatterton in the Muniment-room. Having seen the painting, and studied the works which gave an account of the poet, he made arrangements to produce these illustrations. He constructed in his establishment in Grafton-street a background scene of London from a painting upon canvas, by a clever artist, and so disposed a figure as to represent the dead poet. His advertisement intimated that the stereogram of the death of Chatterton was from the "living model." An affidavit was put in by Mr. Wallis, in which he stated that his picture was original, and that he had not copied from any one. An engraving was produced, and handed up to the Court, from which it was alleged the artist had derived his idea of the death of Chatterton. It purported to have been engraved by Edward Orme, of No. 14, Old Bond-street, painted by H. Singleton, and dedicated to the Marquis of Lansdowne. The date of publication is given as 1st of May, 1794. Beneath the engraving are the words from Cowley—

> "Behold him, Muses, see your favourite son,
> The prey to want ere manhood has begun,
> The bosom ye have filled with anguish torn,
> The mind ye cherished drooping and forlorn."

The engraving represents a garret and miserable bed—Chatterton reclines upon the pallet in a dying state; his head lies at the right side of the picture, the shoe is on the right foot, the other shoe is off; a phial lies on the ground, manuscripts are scattered about, a chest containing papers lies open; on a small table books are seen, and also a candlestick, the extinguisher being on the candle; three pens have been carelessly thrust into an old ink-bottle: upon the wall a caricature or grotesque face has been drawn with chalk or cork. At the door stand a woman and child—the former being the landlady of the house in which Chatterton died. Her face exhibits surprise and terror. It was not contended that Mr. Wallis had copied Singleton's picture, but that Mr. Robinson had. Counsel contended that Mr. Turner's title in the work was incomplete; Mr. Wallis not being at present a party to the suit. After a long argument on each side, the Master of the Rolls said, that whatever the ultimate difficulties of the case might be, there was no question as to what he was bound to do at present. With respect to the alleged failure of Mr. Turner to prove his title, the documents which had been laid before the Court showed that he had a title; that was, if he stated it correctly, and the objection at present was that the petition most certainly did not state it correctly. It was clear to him that there ought to be an amendment in the petition; that the facts should be accurately stated, and that Mr. Wallis should be made a party to the suit. It was quite plain from the importance of the question at issue that the injunction should be continued until the hearing of the case. Suppose that Mr. Wallis had never sold this picture, but exhibited it at Mr. Cranfield's for the purpose of engraving, would he in that state of facts have a right to sue? He had a very strong opinion (though he admitted the question had never been the subject of decision) that the painter had, by common law, the very same protection which the author of any work enjoyed previous to publication. Surely nothing could be more unjust than to say that if a painter gave the public the privilege—and a very great privilege it was in some cases—of allowing them to see a work of art in his studio, a person who had thus inspected the picture, having a good memory, and being an artist himself, would have a right to endeavour by some contrivance to make a copy of that work for instance, by getting his apprentice, as was done in the present case, to dress himself up in a peculiar manner, so as to represent the principal figure in the painting, and then taking a photographic representation of the subject composed in imitation of the picture, and representing it in terms by advertisement as a copy of the picture. This had been done in the present instance—the photographic pictures sold by the respondent having been advertised in the newspapers as "The Death of Chatterton." He looked upon this as nothing short of a fraud—a deliberate fraud; and he had not the slightest difficulty in holding—on the principle laid down in the case of Prince Albert *v.* Strange, which was the principle of common sense, and in the admirable judgment of Mr. Justice Erle in the case of Jeffrey *v.* Boosey—one of the ablest judgments that had ever been delivered—that it would be the bounden duty of a court of equity to interfere in such a case, quite irrespective of the common law right of the painter to sue for damages, which right he would have as long as he had not published the picture. The question then arose whether there had been a publication of the picture: because, if there had, then considering the principle laid down in the case of Jeffrey *v.* Boosey, it would be very questionable what the law might be. He had no hesitation in saying that the exhibition of the painting at the Royal Academy was not such a publication as would deprive the artist of his right. It was a qualified publication—it was a privilege allowed to the public to see works of art. Did any one suppose that if Sir Walter Scott read out one of his productions to a number of his friends, and that one of them had such an accurate memory that he could reproduce every word of it, or that some person was in a corner taking notes in shorthand—did any one suppose that in such a case the reading of the work would amount to a publication so as to give the person who had taken notes a right at common law to bring out an edition of the work? In analogy to that case the exhibition of a picture at the Royal Academy, or at Mr. Cranfield's, or elsewhere, for the like purpose, would be nothing more than a qualified publication, which would not deprive the painter of his remedy at common law or in equity prevent a party from the commission of a fraud in attempting to copy the picture. A difficulty, however, existed as to the third point—namely, that there had been a publication in the *National Magazine.* But for that publication, there would not be any serious doubt in this case. He was not prepared to say, nor did he wish at present to offer an opinion on the matter, what was the effect of that publication in the *National Magazine.* If the respondent had simply confined himself to copying that engraving, it was questionable whether the petitioner would have any cause of action against him.

But he had not confined himself to merely copying the engraving; he had undoubtedly used it in the preparation of the photograph, but he had also adopted the colouring of the picture for the purpose of inducing the public to believe that the photograph was taken from the picture itself. He thought this was a fraud; he did not use the word in an offensive sense, but a fraud in contemplation of a court of equity. He might entertain some doubt as to whether the photographic pictures produced by the respondent would be a serious injury to the owner of this valuable painting; but if this were overlooked the photograph might by a very easy process be enlarged to the size of the original, and thus an unimportant piracy might be followed up by the adoption of another mode of piracy which would be most injurious to the owner of the painting. His Honour concluded by saying that he would continue the injunction.

PHOTOGRAPHY AT THE SEAT OF WAR *

(*From our Own Correspondent.*)

THE priest came in to tell me that the Austrians were in motion, and proposed that we should go together, as he had a brother at Torrione, about whom he was in some alarm, and with whom he proposed we should stay a few days, as we should not be farther away, in the event of a fight, than if we remained where we were, and would, besides, be in all probability out of the line of march of the troops. I was so tired of the idle life I had been leading, that I gladly accepted his proposal; disinterred my camera and other impedimenta, and packed them on my mule, and found it viciously restive from its long rest in the priest's stable. I may mention as a rather curious fact, that in all the requisitions made by the Austrians, the priest's house and property were spared. Whether they acted on the supposition that a priest could have nothing to be deprived of, or on superior orders to respect the clergy, I can't say, but, certainly, the effect was advantageous as far as I was concerned, for had it been otherwise, I should most assuredly have lost my mule.

Having finished strapping on my packs we mounted on our respective animals, and commenced our journey to Torrione. We were a good while on the road, in consequence of being obliged to make a circuitous route so as to avoid passing through Vercelli, and at the same time not to cross the line of troops. There was one advantage attending this, however, which was, that it enabled me to see the condition of the country on three sides of the town, and to judge for myself whether there was any truth in the statements made by the Piedmontese newspapers—for I see these, although I cannot by any possibility meet with an English one—and I am bound to say that it is using too mild a term to say that these statements are gross exaggerations. Some of the fields very close to the town appeared barren of crops, but I could only see them from a distance with my glass, and it is possible that this may not be caused by the troops—but farther away the crops looked as flourishing as in any English county, and everything appeared as quiet and orderly as in a Yorkshire vale; and little children were rolling about in front of the cottages, and, although so little, speaking the mongrel kind of Italian, which they call their language, with a fluency which it would have astonished Mrs. Partington to hear; and not a single indication visible that an enemy had been or was near.

. . . .

The next day, when it was certain that the Austrians had evacuated Vercelli, I, my friend the priest, and his brother, resolved on paying the place a visit. We found the streets filled with litter of all sorts: dirty straw, pieces of wood, bottles, broken and otherwise, bits of leather, and rags abounded; in fact, they were in a very dirty state indeed; a slight aggravation, probably, of their normal condition. A good many of the windows of the houses were broken, and the general appearance of the houses themselves suggested the idea that they had been out on the loose for some time and had not yet recovered; that they were a kind of architectural prodigals, who had been indulging in riotous living and had become considerably dilapidated in consequence; otherwise, they presented no appearance which would induce me to suppose that they had been recently occupied by a hostile army. As we rode along the street the people who were indoors came out, and those who were lying about on the ground got up and looked at us with great curiosity. I imagine they took me for one of the enemy, and had doubts whether my presence did not indicate their return, for I heard several of them asking questions of the priest as to who I was. The respectable portion of the people were indoors I imagine, for those I saw in the streets were very far from inspiring confidence by their appearance. The faces of the men generally had a dissolute, unsettled expression, and I remarked a peculiar, bold expression in the eyes of the women, which struck me as having been possibly communicated to them from the residence of the troops in the town.

We dismounted in an inn yard, which under ordinary circumstances would, I dare say, have been respectable-looking enough, but at present had the same disreputable look as the other houses. The landlord was sitting on the step with his hands in his pockets, and puffing away at a fat cigar with all his might, the thing, I suppose, being home-made, and difficult to draw. He was a black-bearded, swarthy fellow, and seemed good-natured and obliging. As soon as we entered his yard he got up and shouted for somebody, and then, with our assistance, put the mules in the stable.

While we were in the room I took up a Turin newspaper, and from it I learnt for the first time that at least one English newspaper had got a correspondent with the Austrian army, but the paragraph which conveyed the information was not very gratifying to me as an Englishman; it began:—"*Ecco che abbiamo un inglese, il quale pensa che i poveri piemontisi non sono abbastanza spogliati dagli Austriaci senza la sua assistenza;*" and went on to refer to the said correspondent having taken a private carriage for his own use by force to convey his luggage from Vercelli, and of what he would receive for such an action if he got his deserts, and a good deal more besides. I felt sure when I read it that the charge could not be fairly stated, so I called to the landlord and asked him if he had heard anything about it, and found that the carriage was actually his property, and the account he gave me of the affair threw a very different colour on the transaction. His statement was rather a long one, but in substance it amounted to this:—"That he was asked in the first place to lend the carriage, but fearing that if it left the town with the Austrians there would be very little chance of his seeing it again, he refused; that, thereupon, it was taken against his will, but was afterwards sent back, together with a very fair price for the hire of it." Such is the true history of a transaction which may have been translated from the Sardinian papers into the English journals in all its original blackness.

We wandered all over the place during the remainder of the day, I marking the places of which I proposed taking a picture, and which were chiefly interesting as memorials of a town which had just been abandoned by the enemy.

These negatives, I mention by the way, were almost failures; they are not so bad as to prevent my using them, but the prints will be indifferent; I can detect specks in the deep shadows, and a want of definition in the half-tones. I attribute this to the agitation which the collodion and other chemicals had undergone during the journey, and I am sorry that I did not use the dry plates on this occasion. I am not very strongly attached to the dry process, and would never adopt it while I could use the wet, because I have never been able to obtain as good results by its means as with the wet collodion; but at the same time I can readily believe that the prepared plates have an actual advantage when one wants to take a picture immediately after or during a rapid journey on a mule's back. A journey by railway does not improve the working properties of collodion, but such travelling is perfect immobility as compared with the trot of a mule; and on this occasion we had pushed along pretty sharply in spite of the heat, in consequence of the padre's anxiety on account of his brother. . . . .

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* Continued from vol. ii. p. 197.

Vinzuglio.

I have just returned with my camera and three negatives from Palestro. I had taken five, but a stupid Piedmontese soldier came and lifted up my tent, and thrust his head and shoulders in, knocking down a couple of them which I had stood up to drain, and completing their destruction by laying hold of them with his clumsy paws and rubbing away half the film. I will send you proofs of these as soon as I have an opportunity of printing some. They will not be quite like what I hoped to send you. You will see many dead bodies scattered about among the trees, and many lying side by side ready to be thrown into the hole in which they will be interred as soon as it has been dug, but no bodies of men in actual conflict; I felt it would be absolutely impossible to get near enough to pitch my camera, though I was myself able to see the fight distinctly from beginning to end.

At Torrione the night preceding the battle, nearly everybody was in the street expecting every minute to hear the report of guns, as we knew that the French and Sardinians had got as far as Vercelli in considerable numbers, and also that the Austrians were in the immediate neighbourhood, at the place in which I am concluding this letter among others, and which is not more than four miles from Vercelli. Every now and then one or two would get so impatient that they would walk in the direction of the town to see if they could hear anything of what was going on. I tried to get some sleep, intending to start as soon as it was light to see if there was any sign of a battle being fought, or if the Austrians had continued their retreat.

There was no time lost after the sun rose in preparing to get away. I threw my glass over my shoulder, put a piece of bread in my pocket, and was off with the padre, his brother, and four or five others. We took the direction of Palestro, and pursuing our way across the fields, it was not until we had got near it that we approached at all closely the allied troops. We first came upon a strong force of Sardinians marching along the road towards Confienza, and remained standing in the field beside the road until these had passed. The appearance of the men and their bearing were such as to inspire confidence in them. The expression of their faces was resolute and determined, though different. Some were smiling, and stepped out with an air of eagerness, as if they were going to a dance instead of a fight; others seemed deadly pale by comparison with the swarthy faces about them, and these were not the least resolute looking. It sent a thrill through me as they went marching by, entirely silent as regards voices, and giving no sound but the regular tramp, tramp, mixed with the rattling of the scabbards of the cavalry, and the jingling of the accoutrements of the horses. There is something wonderfully impressive in the sound of the marching of a body of armed men, and yet it is not because they are armed, for I afterwards saw bodies of men moving towards each other to engage in actual combat without any similar feeling, but they were at a distance, and I could only see and not hear anything beside the reports of the guns; but to return. As soon as the road was sufficiently clear, we crossed over and continued our way across the fields, regulating our progress by the march of the troops, which we could now see moving towards Palestro in considerable numbers. With my glass I could distinctly see the Austrians in the last-named place, and as it was evident that the battle was to be fought there, we made our way to a little group of tall trees, up which we climbed, perching ourselves on the branches and waiting for the commencement of the slaughter. It was the most exciting time I ever spent in my life. My heart beat at a tremendous rate, not from fear, for there really was nothing to fear beyond the exceedingly improbable event of a shell bursting among us, but there was something terrible in the spectacle of bodies of men preparing to kill each other.

The Austrians were the first to begin. I happened to be looking in their direction at the moment and saw the bright flash, and at the same time that I heard the roar of the gun I saw a slight movement among a body of soldiers who were ascending the slope, and then the dirt fly up in little columns behind them until the ball came to a stop in the field. Another report followed, the troops increased their speed, and soon the air was filled with a confused sound of reports of small arms, the booming report of cannon, and the shouting of the men engaged. I was so near that I could see with my glass each individual soldier, but to describe what took place over the whole scene of the fighting is out of my power. My attention was so engrossed on one point or another that I was unable to pay attention to what was passing elsewhere at the same time. There was a large body of Piedmontese, who halted when within a short distance of the Austrians, and fired, and then dashed forward to charge with the bayonet. I could see an officer a little in advance of the foremost rank waving his sword, and his face turned rather towards them, I suppose urging them on, who was struck to the ground as if by a flash of lightning. Another dark-looking figure appeared immediately in his place; the goal was gained, there was a concussion, a confused waving of arms, mingled with rapid flashes from concealed individuals who seemed to be firing among the attacking party, who were forced back in a mass, and retired for some distance; the Austrians following them but a little way and then going back and giving place to the artillery, which re-commenced firing, and the first few balls making a complete line through the mass of troops who were mixed up together in confusion. This was the most painful spectacle that met my eye during the whole of the battle. While they were in actual conflict there was something stirring and exciting, which made one feel a longing to be among them, but to see men struck, beaten, and torn to pieces when they were in a perfectly helpless condition made my blood run cold. Fortunately this did not last long. A fresh body of troops advanced to the attack as confidently as if nothing had happened to their comrades. There was the same scene, but instead of their following the downward course of those who had preceded them, I could see them pressing closely upon the Austrians in a dense mass. The Austrians held their ground firmly and tried to force them back, but not succeeding they began to give way, very slowly at first, for those behind pressed those in front forward, but gradually the backward movement was communicated to those in the rear, and they receded more and more rapidly before the pressure of the allied troops until they were hidden from my sight by intervening objects. It was the old tale of the Chinaman—"Suppose you must come in, we must go out."

Looking to another part of the field, I was surprised to see a body of Austrians almost close to our post of observation, advancing at quick step in the direction of a body of French troops, who were facing about, and in two minutes more were rushing to meet them at a kind of trot. Several men fell on both sides when they came into collision, and others were forced into their places; those who had fallen being trampled upon by both parties alternately. Some hand-to-hand fighting ensued, the French fighting with the ferocity of tiger cats, and gradually compelling the Austrians to retreat, not in a broken and disorderly manner, but in a compact mass, which rendered it difficult to do them much harm with the bayonet, but rendered them an easy mark for the French rifles. The French troops scattered themselves a little and fired into the retreating Austrians as fast as they could load, apparently without any orders, and fighting on the simple principle of doing the enemy as much harm as possible. Two or three times when the French soldiers approached very closely, a portion of the Austrian troops turned at bay and drove them back a little, but the moment they resumed their retreat they were harassed anew. As far as I could judge they lost ten times as many in this way as in the actual conflict. It was a horrible sight; the contending parties were so close to me that I could distinguish the cries of the wounded mingled with French oaths, and the rattling sound of the guns as they came in contact. It was during this part of the battle that I and those with me had a narrow escape of being shot like so many rooks. A thick-headed Sardinian peasant, whose patriotism exceeded his discretion, had managed to get hold of a gun somewhere, and thought it an excellent opportunity of getting a shot at the *Tedeschi.* He was perched on a branch in the tree next the one in which I was, and had just got the gun to his shoulder when the padre's brother, who was a little above him in the same tree, caught sight of his operations, and, with an instinctive sense of the danger he was about to bring upon us, gave him a tremendous kick on the side of the head which sent him tumbling from branch to branch almost to the ground.

There was a good deal more fighting than that I have endeavoured to describe, but it was not so closely under my eyes, and by slow degrees the firing ceased altogether, and we concluded the battle was at an end. As soon as we descended to the ground, the priest proposed that we should see if we could do anything for the wounded, and of course we were all willing to adopt his suggestion. Their groans would have directed us to where they were lying, even if we had not been able to see them. You can form no conception of the sickening sensation I felt when I found myself in the midst of pools of blood, which splashed about at every step, spreading a sickening smell in the atmosphere. The bodies of the slain were lying pell-mell among the wounded, very few of whom were able to withdraw themselves from the horrible contact. We moved each in succession, and laid them gently on their backs—the dead, dying, and wounded side by side, leaving them thus until the men who had gone to get some water returned with the patrols who were out collecting the wounded. No time was lost in selecting those who were placed in the ambulance first; they were taken pretty much at random, only those who seemed actually dying were passed over in favour of those whose wounds seemed slighter. One of those so passed over was, I think, an Englishman. He had all the appearance of one, though he was dressed in the Sardinian uniform. I moistened his face with water, and poured some into his mouth, but he had not strength to swallow it. I got him carried down to a tent where the surgeon was operating, who was kind enough to see to him at once, but he could do nothing to save him. A bullet had passed through his thigh, severing the artery, and he had bled to death. I did all I could to make his last moments easy by wetting his face with water. . . . . He had five Napoleons and a few francs in his pocket, and round his neck there hung a portrait of an extremely pretty English girl, on the back of which was written, in a female hand, the initials E. R., and the date December 14, '58. J. L.

[From the abrupt manner in which this letter concludes, we imagine it must have been sent to Turin by some unexpected opportunity.—ED.]

ON RECENT CONDITIONS OF THE ATMOSPHERE.

IN a recent number we published an interesting communication from Mr. Hardwich on the subject of the influence of the condition of the atmosphere on the quality of the negative. This is a subject well worthy of consideration, and it is possible that if a series of observations were made and recorded, it might be possible for a photographer to obtain good pictures under every aspect of the weather, by varying his compound chemicals according to circumstances. The following, relative to a peculiar condition of the atmosphere at a certain season of the year, is taken from *Cosmos*:—

"At the present moment we are in a really extraordinary phase of atmospheric pertubations, remarkable alike from their violence as from their extent. Hardly a day has passed, during the last fortnight, that a heavy storm has not raged in London, as in Paris, in Milan, in the Jura, and the most widely separated districts of France. The most observable thing in these storms is that they are renewed every year at the beginning of June. How can we explain these grand phenomena? No doubt the epoch of the year, comprised between 15th May and the 30th June, is the epoch when vegetation is most rapid, when evaporation is most abundant, when all the sources of electricity are in full activity, when the atmosphere is likewise in a condition favourable to the accumulation of electricity. It may be conceived, therefore, that if a storm bursts at the end of May, or the beginning of June, the disturbed equilibrium is re-established very slowly, and that storms may succeed each other during many days, a month, or even forty days; and this might be the foundation of the old adage relative to St. Swithin. We do not think, however, that these relations are sufficient to explain everything; we are decidedly of opinion that the intervention of another and much more important cause is necessary, which has been too much overlooked hitherto. In his communication relative to coloured shadows, M. Babinet said, 'The 27th May the sky was entirely veiled by a fog, which did not allow a glimpse of blue colour to be seen.' We had made the same remark, and had, moreover, noted the fact that, for a fortnight, the sky had been grey, and never of an azure blue, and that its depths were invaded by a kind of dry fog or thick smoke. That in the morning the horizon, especially towards the west, was alarming to see, it was so totally devoid of all transparence.

"Is this state of the atmosphere abnormal, observed for the first time in June, 1859; or, is it a constant periodical phenomenon which has often passed unobserved because the attention of meteorologists has not yet been sufficiently awakened? We put that question to ourselves, and we were far from foreseeing that the power of resolving it would be so soon given us, when, on the one hand, the recollection of a paper, forwarded to us by M. Goldschmidt last year, recurred to our memory, and likewise the reading of M. Coulvier-Granier's researches on meteors suddenly opened our eyes. 'If,' wrote M. Goldschmidt, 'the dry fog is rarely observed at Paris, it is because men occupy themselves there but too little with what passes in the depths of the atmosphere. A fog of this kind enveloped Paris and its environs on the 6th June of last year, and I find in the meteorological table of M. Heiss, the celebrated observer of Munster, that the fog was likewise very dense in that town from the 2nd to the 7th June. At Paris it coincided with a north-east wind, and was accompanied by an intense odour of sulphur or creosote (the same odour was very sensible on the 27th of last month); the atmosphere gave evident signs of electricity, and at Munster the ozonometrical paper assumed a very deep tint. I have ascertained that, for many years past, the same facts have often recurred at the same epoch; I have even thought of addressing a memoir on the subject to the director of the observatory.'

"In the following lines we faithfully give the substance of M. Coulvier-Granier's observations, and the documents he has collected on the subject:—

"The dry fog of 1783, which extended over the whole of Europe and other parts of the world, invaded the atmosphere from the 27th May to the 15th June; the not less celebrated fog of 1831 also continued from the latter end of May for some days in June; and we may say, generally, that the dry fog makes its appearance usually in June. When it appears, the azure of the sky becomes dull, or rather it is grey, even in the entire absence of clouds; the sun has a reddish tint; distant objects are effaced from view, or are only visible through a veil of vapour, a part of the shooting stars, which ought to be seen, escapes from sight. Every year this greyness of the sky is visible, sometimes its duration is short; at other times, on the contrary, it acquires consistency, becomes more dense, and extends to very distant regions. At the instant when the transparency of the atmosphere ceases, the regions of cirrus contain, in much greater abundance, the gases or other matters to which they owe their existence; hence the fog which renders the sky grey, takes its rise in the elevated layers of the atmosphere at the height of the cirrus, the aurora borealis, and possibly the shooting stars; it is not impossible that it may even take its rise in the ethereal regions, from whence it descends to the earth, collecting, in its passage through the inferior zones, that which gives it the consistency necessary to render it visible to our eyes. This kind of fog is, at times, highly electrical. . .

"It is, therefore, a well-ascertained fact that the dry fog is a very common phenomenon at the end of May or beginning of June, the period signalised for a long time past as being fertile in intense or prolonged atmospheric perturbations, storms, aurora borealis, &c., and it appears to us impossible not to admit that there is, between these two phenomena, the relation of cause and effect. Let us add, finally, though with some timidity, that June is six months distant from November, the month of the periodical appearance of shooting stars in considerable numbers. In November the earth is near its perihelion, in June it approaches its aphelion; will it be in relation, at these two phases of its annual revolution, with the layer, or the great ring of cosmical matter, the existence of which, round the sun, is demonstrated by so many other facts? Will the first passage be marked by shooting stars, the second by dry fog? M. Babinet has, for a long time, been trying to ascertain if he could not, about the month of June, see, during the day, shooting stars pass between us and the sun; we have ourselves watched the heavens for the same purpose. Now that which we were seeking at a distance and in vain, might it not have been close to us in the form of a dry fog, obscuring the sky, rendering it grey, depriving it of its transparency, and liberating the electricity by friction, the origin of the frequent and terrible storms of the latter end of May and the beginning of June?

"We will go no farther; perhaps even we should fear to have gone too far already, if we had not had for our sole motive the desire of stimulating the ardour of our readers, to bring from them communications relative to the result of their observations, which we shall be very happy to receive and to subject to analysis. There is evidently, in the direction we have indicated, some important discovery to be made, some grand law to formularise."

There is a reference, in the above paper, to the presence of a strong odour of sulphur during some of the recent storms; it will be of interest to those photographers who employ rain water, instead of distilled water, to know that the presence of sulphuric acid in this water has been ascertained beyond a doubt.

POSITIVES WITHOUT THE EMPLOYMENT OF SILVER.

BY M. POITEVIN.

The author has shown that light acts chemically upon a large number of compounds, even amongst those on which no observations have yet been made, in such a manner as to cause them to assume a lower state of oxydation, that is to say, to eliminate one of the electro-negative elements which they contain. At present his object is to make known a photographic application which permits of proofs being obtained in which gallate of iron (ordinary ink) is the only colouring agent.

Make separately two solutions, one of perchloride of iron, 10 parts to 100 of water; the other of nitrate of uranium, of the same strength, and mix them together in equal quantities. Take good photographic paper (thin is preferable), and float it for some seconds on some common water, to moisten the side which is to receive the preparation. After draining it, place the dry side on a glass or dish a little smaller than the sheet, and pour on to the surface a sufficient quantity of the above mixture of the two solutions; allow it to flow over its surface several times, and pour the excess into a capsule or flask. This mixture may be kept unaltered for several days, if it is not exposed to the light.

The sheet thus prepared is to be placed to dry spontaneously in the dark. When dry it is of a tolerably dark yellow colour. It is impressed *through* the design which is to be copied; this design should be a positive, since the impressed parts of the prepared paper give the white parts. A positive on glass is the one to be preferred; but a positive proof on paper previously waxed, may also be used. The time of exposure behind the positive is from fifteen to twenty minutes in the sun, but it will vary according to the intensity of the positive; in all cases the necessary time may be judged by the colour of the paper, which from an intense yellow will become white under the influence of the light, and this decoloration should penetrate through the paper. The decolorised part is formed of perchloride of iron brought to the state of protochloride, which takes no colour under the influence of the gallic acid employed to develop the image.

In order to obtain the picture black, moisten the sheet as in the first instance on ordinary water, drain it, lay it on the plate of glass, and pour over the surface a saturated solution of gallic acid, or a 2 per cent. solution of pyrogallic acid, or even a concentrated infusion of gall nuts.

Gallic acid gives, in those parts of the perchloride upon which the light has not acted, a dark violet colour. Pyrogallic acid gives a grey plumbago-like colour, similar to a copper-plate engraving. A mixture of the two acids gives an intermediate colour, which can be varied by graduating the proportions.

To fix the proofs, it is sufficient to wash them in common water, to renew it once or twice, sponge them, and then let them dry. The colour darkens in tone on drying. Proofs thus obtained are as unalterable by atmospheric agencies as are writings in common ink. This process offers, then, the double advantage of cheapness and durability of the proofs.

ON SENSITISING ALBUMENISED PAPER.

BY JOSEPH DIXON.

Those who have used albumenised paper have invariably experienced difficulties not encountered in the use of the paper commonly employed in photography. Albumenised paper sensitised with the nitrate of silver, will, in the course of two or three days, gradually become brown. This result is injurious to the white portions of the picture, and, although it may in a great measure be removed in the toning bath, it is always accomplished at the expense of the finer tints. Albumenised paper, more particularly, should be used immediately after it is sensitised; but there are many cases occurring in which this condition cannot be complied with. Suppose, for instance, a large number of sheets are prepared at once, but, before they can be used, several dark cloudy days intervene, when the paper will be found to have assumed a brown shade, and will be almost worthless. The cause of this singular occurrence, is sulphur existing in the albumen. The chloride of silver is readily decomposed when combined with organic matter, and in the present instance the gradual formation of the sulphide of silver is shown by the darkening of its characteristic brown colour until it verges upon a black.

After a great number of experiments made for the purpose of avoiding this vexatious difficulty, I have arrived at the desired result by the use of the following simple preparation, viz.:—one ounce of the nitrate of silver dissolved in eight ounces of water, to which is added one drachm of nitric acid; on this the paper is floated for two or three minutes. It is then hung up and dried in the usual manner, and afterwards placed in a portfolio, where it may remain without deterioration for six or eight weeks. My usual practice is, after printing, to pass the paper through a bath of chloride of sodium, which converts the free nitrate into a chloride, and thereby prevents injury to the toning bath.

BALLOON PHOTOGRAPHY.

We have on many occasions advocated the employment of balloons for photographing military positions, and that the photographers who form part of the *corps* of engineers should be exercised in this kind of photography. Many months since we announced that M. Nadar, the well-known photographer, had made an ascent from the Hippodrome at Paris, and we have been recently informed that he has been sent for by the French War Minister with a view to ascertain if his services can be made available in Italy. The ascent of M. Goddard is a proof of the serious view taken by the Emperor of France of such means of ascertaining the position of the enemy.

Dictionary of Photography.

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Distortion.—The effect produced on the rays of light proceeding from an object during its passage through the lens, by reason of which the resulting image is not a true representation of the object. Many of the effects of distortion are inherent in images formed by lenses having spherical surfaces, but they can, in general, be so much reduced by a skilful adaptation of the curves of the various surfaces, that *distortion* should never occur to an appreciable extent if lenses by good makers are employed, and are not used unfairly.

Dry Collodion Process.—This term is applied indiscriminately to all processes in which the collodion plate, after having been rendered sensitive in the usual manner, is prepared by washing or coating with a solution capable of preserving its sensitiveness; whether the resulting film be perfectly dry and hard, or moist and sticky.

Dynactinometer.—An instrument used for measuring the intensity of the photographic rays, and comparing the powers of different object glasses. It is thus described by the inventor, M. Claudet:—It consists of a thin metallic disc, perfectly black, having a slit extending from its centre to the circumference fixed on an axis, revolving through a permanent metallic disc, perfectly white. The white slit has also a slit from its centre, the exact length of the radius of the black disc; and by means of these two slits, which are so adjusted that the black disc can intersect the white disc, and by revolving, gradually cover the whole white area, the space of the white surface on which the black disc can be superposed forms itself a sort of dial which is divided into any number of equal segments, all numbered. The inventor has adopted the number of 20 segments for a large circle, inscribed on the dial, and of 8 segments for a smaller circle after the manner of the divisions of the Focimeter, but on the same plane. These 8 segments are numbered in geometrical progression, 1, 2, 4, 8, 16, 32, 64. The black disc may be made to revolve in such a manner that it shall cover a new segment of the larger circle during each second or any other equal fraction of time. By that means the last segment will have received 8 times more light than the first, the black disc having moved over the whole in 8 seconds. The difference of photogenic intensities are hardly observable when they follow the arithmetical progression; the instrument is therefore constructed so that it may indicate the intensities in the geometrical progression. The first segment always remains covered, in order to be represented black on the photographic plate and to mark the zero of intensity: the second is exposed to view during 1″, the third during 2″, the fourth during 4″, the fifth during 8″, the sixth during 16″, the seventh during 32″, and the eighth during 64″. This series, which could be extended by dividing the circle into a greater number of segments, is quite sufficient for all observations intended for practically measuring the intensity of the photographic light, and for comparing the power of object glasses. The instrument is made to move by applying the hand on a handle fixed on the back at the extremity of the axis on which the disc revolves. An operator accustomed to count seconds by memory, or by following a seconds watch, can perform the experiment with sufficient regularity; but in order to render the instrument more exact and complete, it can be made to revolve by clockwork, which gives it at will either the arithmetical or the geometrical progression. For the instrument moving by hand it is necessary that a second person should open and shut the object glass at a given signal. But in adapting before the object glass a flap connected with a cord and pulley, the operator holding the cord in the left hand can open the flap at the moment that he makes the disc revolve with the right hand, and shut the apparatus when the revolution is completed. When the instrument acts by clockwork the object glass may be opened and shut by the same means, at a signal given by a bell, which strikes at the commencement and end of the revolution. If the sensitive plate receives the image of the dynactinometer during its revolution, it is obvious that each segment indicates an effect in proportion to the intensity of light, and to the time that it has remained uncovered; also that the number of seconds marked on the first segment visible is the measure of the intensity of light at the moment of the experiment; the effect of each segment being in reality the degree of intensity which can be obtained during the corresponding time. When we want to compare two object glasses, they are adapted to two cameras placed before the dynactinometer. After having set the focus of the two apparatus, they are charged each with a sensitive plate. When all is ready, the flaps are opened at the moment that the dynactinometer commences its revolution, and they are shut when it is completed. The plates are removed, and the images developed. In comparing the result produced on each, it is easy to see which object glass is the most rapid, and in what proportion. For instance, if the arithmetical progression has been followed, and one of the plates has the number 4 on the great circle the first visible, the conclusion is that it has been necessary for the intensity of the light at that moment to operate during 4 seconds, in order to produce an effect in the camera obscura; and if on the plate the first seven segments have remained black, and the eighth is the first on which the light has operated, the conclusion will be that the object glass, which has produced the effect on the first plate, has double the photographic power of the other. But if the geometrical progression has been followed, the same experiment will show the image of the segment No. 3 represented on one plate, and that of the segment No. 4 on the other, as having each the first degree of intensity, and we have only to draw the same conclusions as regards the power of each object glass. In all experiments with an instrument of this kind, it must be remembered that the conclusions will only be exact on the supposition that the two plates were endowed with the same degree of sensitiveness, for if they had not been so endowed the difference might be due not to any difference in the power of the object glasses, but to inequality in the sensitiveness of the plates. Consequently, the experiments should always be repeated several times, and the *mean* result taken.

Effervescence.—A kind of ebullition or commotion in a fluid, which takes place when part of it flies off in the form of gas, escaping in innumerable small bubbles.

(*To be continued.*)

The Amateur Mechanic.

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GUTTA PERCHA—(*continued*).

If gutta percha be adulterated with any of the mechanical impurities we have described, it will be, for the most part, useless in the hands of the amateur for any photographic purpose, except, indeed, such as involve no need for purity or forsstrength. The only mode of purifying it from matter of thi kind, would be much too expensive to render it generally available. By dissolving it in bi-sulphide of carbon or chloroform, or even in benzol, carefully filtering, or in some cases simply decanting and evaporating the solution, gutta percha in the purest form would be obtained, no matter what amount of foreign matter might have been present; but this is obviously a process too troublesome and expensive for ordinary purposes. If water be the only deleterious matter present, a very simple and ingenious method of getting rid of it has been suggested by Mr. Sang, to whom, for many clever practical hints on the mechanics of photography, our readers are indebted. The mode he proposes is to collect the various pieces of gutta percha to be purified, and after forming them into a cake by means of heat, to cut this cake, with a carpenter's plane or otherwise, into fine shavings; a few of these shavings are attached to a wooden spit suspended before a fire, and kept in motion by means of a roasting jack. Then gradually, as the gum becomes softened, the water it contains is evaporated; fresh shavings of the article are thrown on from time to time, and at once attach themselves to the softened and dried mass, until the whole is gradually freed from its moisture, and ready in a plastic condition either for immediate manipulation, or to be preserved for future use. Great care must be used in doing this that the heat never rises beyond 240° Fahrenheit, or there will be danger of the gum melting and its quality being injured, becoming, in fact, partially decomposed.

Before quitting this part of the subject relating to the impurities and injurious action of gutta percha, it may be important to make one or two remarks which will be of service to the purchaser of manufactured gutta percha articles. In purchasing a bath for nitrate of silver, it will be wise to give the preference to a *moulded* article rather than one simply made by joining the sheet, for this reason: the process of moulding, as we have seen it conducted, is managed by means of hydraulic pressure; we do not remember, at this moment, the number of tons to which the pressure is equivalent, but it is sufficient to render it almost a certainty that all water must be expelled from the plastic material. As regards those joined by hand, of course no such elimination of water previously existing in the sheet could take place. Another fact should be remembered prior to using gutta percha articles: in manufacturing this material, a solution of soap and water is used for preventing it, whilst in the plastic state, from adhering to the moulds; this, of course, requires carefully removing. The best plan is always to wash them thoroughly with a strong alkali, say caustic potash, and afterwards rinse them with dilute nitric acid, and lastly with distilled water. Finally, for the purpose either of obtaining perfect assurance of the absence of all danger, or for rendering available vessels of doubtful purity, it has been found useful to coat the interior with a varnish of shellac. For this purpose the ordinary lac varnish would be too thin, unless several coats were applied, and in doing this there is some slight danger in applying the second coat of disturbing the first; it is desirable, therefore, to have a much thicker varnish—one part of shellac in three or four of alcohol, or of methylated spirit, which will do quite as well, and is much cheaper, will make a good varnish for the purpose. The vessel should be carefully cleaned and dried, and the varnish applied with a brush, or poured into the vessel, inclining it every way until all parts are covered, and then pouring out the residue. This should be done near a fire, for the double purpose of preventing the varnish from chilling, and of causing it to set rapidly, so as to secure it from catching dust. This varnish would be of no service for a vessel to be used for holding acetic acid, as shellac is acted on by this acid, as well as by mineral acids and strong alkalies.

Gutta percha is procurable in sheets of almost any thickness, from what is called satin tissue, an article little thicker than goldbeater's skin, to an inch thick. The most useful form for the amateur's manipulation is in sheets from one-eighth to one-sixth of an inch thick. It is, of course, sold of different qualities, that is, having undergone different degrees of purification. Where the amateur has opportunity of ordering the kind he wishes, he should ask for it of the best quality, *strained*, which will describe that which has undergone the utmost mechanical purification of which we have already spoken. He will then be prepared to proceed to the manipulation of any article he may require, the mode of doing which we shall describe next week.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *5th July*, 1859.

WHEN alluding, a few weeks ago, to the present fearful war in Lombardy, I spoke of a new topographical apparatus, invented by M. Porro, and promised your readers a description of it. This instrument is really wonderful, both as regards its power and the simplicity of its construction. The only great difficulty—which, however, is now completely vanquished—consisted in manufacturing an objective for the camera of which I am about to give a description. M. Porro has had to undertake a considerable amount of mathematical labour, to enable him to manufacture this objective, which is composed of three differently refracting media, each calculated to a nicety. He cannot give any details as to its construction until his patent is taken.

The instrument, which I saw yesterday for the first time, and with which I was much struck, was executed by order of the Piedmontese Government, and will soon be on the field of battle. The following description is given in M. Porro's own words:—

"I.—Two or more cylindrical (panoramic) perspectives of a country, a field of battle, &c., being given, we can, by very simple and rapid operations made in the house, draw out the plan and the *relievo* of the ground, that is, make a topographical plan and describe the curbs of its different levels. The use of special scales for heights and distances renders this work much easier.

"II.—Photography, as it is practised at the present day, gives us plain perspectives, which are agreeable enough to the eye, but whose geometrical dimensions are deformed by the phenomenon of aberration: it is as much as we can expect if these perspectives are geometrically tolerable when they embrace, at most, 10 degrees of the circle. To take down, therefore, the entire horizon of a country, it would be necessary to take about 40 photographic proofs—a thing which would be quite impracticable in face of the enemy, and in any other circumstances far too tedious and complicated a series of operations.

"III.—To take a panorama rigorously exact, without any deformation whatever, of the whole horizon, in three proofs, by an operation that can be accomplished in a few minutes. . . . . . .

"No manipulations to be made upon the field. . .

"The apparatus to be of a very small volume, capable of every transportation and rapid action. . . . .

"Such were the problems that I resolved to endeavour to solve, and that, I am happy to say, I have solved completely.

"IV.—The solution of this topographical problem consists:—

"1st. In an objective glass extremely convex—in fact, spherical—formed of three different media, each having a proper refractive power, calculated by the method which I published last year.

"2nd. In a cylindrical camera constructed especially for the purpose, and furnished with a magnetic needle, a water-level, screws to level it, &c."

[This camera, which is circular, is hardly a foot and a quarter in diameter, and about half a foot deep. The objective is placed in the centre, and forms the axis of this circular box. A metal cylinder falls over the objective; this cylinder is lifted when a view is taken. Behind the objective on the border of the box, shut in by two folding doors, and occupying one-third of the circumference of the camera, is a striped glass, behind and against which is placed the photographic paper. On each side of the objective is a reel. From one of these reels the photographic paper is unwound, whilst it is wound on to the other—in passing from one reel to the other the paper moves behind the glass against which it rubs.]

"3rd. In the use of dry waxed paper that can be preserved according to processes already known.

"V. The sensitised paper, in form of long bands not quite half a foot wide, is wound upon reels, and each reel is enveloped in a case which shields it from the action of the light. Each reel can, moreover, take enough paper for fifty proofs.

"One of the reels being thus charged with photographic paper, the side openings of the apparatus are closed and the operator starts off. On arrival at the field where work is to be done, the instrument is stationed as an engineer's compass or a theodolite. When placed in a proper direction, the objective is uncovered and a view is taken. The objective is then covered by allowing the metal cylinder to fall. That portion of the paper which has received the impression is wound on to the second reel, at the same time the first reel gives off a corresponding quantity of fresh paper. The instrument is then turned one-third of a revolution on its axis and another view is taken. A third view completes the whole horizon—north, south, east, and west.

"A series of lines crossing one another at right angles are engraved upon the glass, which forms the focal support for the paper. These lines have between them an interval of five degrees each way, vertically and horizontally; an impression of them is taken on every negative at the same time as the view. In this manner any inconvenience from a shrinking or other deformation of the paper during development and fixation is obviated. Three small scales of a spiral form mounted under as many lens, permit us to measure on the photograph itself the dimensions, distance, &c., of objects, and to take thus, without the aid of a compass, all the necessary measures for the construction of a complete topographic plan.

"When the proof is to be examined it is placed upon a flat glass, underneath which is a mirror to light it up; in this position it is examined with the magnifying glass, and by means of the scale of measure, the dimensions, distances, &c., noted down.

"The paper may be prepared and sensitised a long time beforehand; and after it has received an impression, the development and fixation processes may be deferred, if necessary, for many days."

M. Porro invented this beautiful instrument principally for military purposes, but it can easily be applied to all kinds of engineering, surveying, construction of railways, roads, canals, &c., &c. My friend, who has had many a hard day's work with the theodolite and the level, tells me that with his new instrument he can perform in a few minutes determinations in the field which have often demanded many days of fatiguing observation with our ordinary engineering instruments.

The *Cosmos* speaks of a M. Richebourg who has discovered a method of taking vertical photographs, such as paintings on ceilings, &c.; but the process is not described. All we know yet is that this photographer has taken in one single proof an image of the large painting by M. Burloff, a Russian artist, which decorated the cupola of the church of St. Isaac, at St. Petersburg.

In speaking of M. Nièpce's experiments concerning the "new action of light," the same paper, after repeating some facts to which I have already alluded, states that M. Nièpce de St. Victor had made, with his tartaric acid paper, rather a novel application, namely, that of ripening grapes!

Paper soaked in tartaric acid is one of those substances which, in M. Nièpce's phraseology, "absorb and retain light" with most facility. This light, absorbed and retained, remains chemically active for some time, as all your readers are aware. Now, M. Nièpce, according to the *Cosmos*, asserts that if a bunch of grapes is placed in a paper bag, for instance, which has been submitted to the tartaric acid solution, not only will these grapes ripen sooner than others that are not placed in these favourable conditions, but, moreover, the quantity of sugar they contain will be augmented. It is possible, it is probable, but it remains to be proved.

M. Pisani relates to me an experiment which proves undoubtedly that, by the action of light upon iodide of silver, a certain amount of iodine is set at liberty. A dissolution of iodide of starch is made. This solution, which is of an intense violet colour, becomes white when nitrate of silver is added to it. M. Pisani has based upon this phenomenon an easy and excellent method of testing silver ore. Neither nitric acid, nor salts of lead, copper, &c., act in the same manner as salts of silver upon iodide of starch. Nothing is easier than to prepare a test liquid with iodide of starch, by determining how much nitrate of silver it requires to lose its blue colour.

Now, suppose a specimen of argentiferous galena (sulphuret of lead) is presented, and that we wish to determine how much silver it contains. A given weight is dissolved in nitric acid, and tested with the iodide of starch solution.

It was in making these sort of experiments that M. Pisani discovered a direct means of ascertaining that iodine becomes free by the action of light upon iodide of silver. To the blue iodide of starch solution a certain quantity of nitrate of silver is added. Iodide of silver is immediately precipitated, and when enough of the silver solution has been added the iodide of starch is completely discoloured, and remains of a muddy white tint. If, now, the glass that contains it be exposed to the light, the white liquid becomes blue again in a very short time,—evident proofs that iodine is liberated from the iodide of silver which forms the precipitate.

A medical man, Dr. Duchesne Duparc, has lately presented to the Academy of Sciences here a paper upon certain thereupeutic qualities belonging to one of our commonest seaweeds, *Fucus vesiculosus.* According to his account, it constitutes an excellent remedy for obesity. It can be taken in any form.

I have long since ceased to put much faith in any medicine, old or new; but a great prize having been offered in England, as you are aware, for the best essay on the uses of Marine Algæ, I was tempted to notice this. To tell the truth, however, it was the name of the plant that struck me most, and called my attention to the paper alluded to, as only three years ago my esteemed and very talented friend M. Kickx, professor of botany in the University of Ghent, described no less than 27 distinct *varieties* of this sea-weed, in a most admirable memoir* read at the Royal Academy of Sciences at Brussels, and subsequently published. *All* these varieties are to be found in the North Sea.

Fucus vesiculosus, *L.* is certainly one of the most interesting plants in Nature. Its geographical extension is considerable. It is met with in the Baltic, the North Sea, the English Channel, the Mediterranean, the Atlantic, the Pacific Ocean, &c. &c. The late researches of Thuret and Pringsheim have shown us that, like *Fucus serratus*, *F. vesiculosus* is dioïc, *i. e.*, that there are male and female individuals, the former being easily distinguished from the latter by the yellow colour of their seed vessels. How we should have been laughed at ten years ago, had we spoken of male and female sea-weeds!

Professor Harvey says of *F. vesiculosus*:—"This plant is extensively used in the manufacture of *kelp*, and furnishes, besides, excellent winter food for the cattle in the western islands of Scotland;" and of *F. serratus*, a species closely allied to the former, ". . . is sometimes used in the manufacture of kelp, but rarely, as it is far less productive than *F. vesiculosus.* It, however, forms excellent manure, and in Norway it is used, mixed with meal, as provender for cattle."

Photographic Societies.

French Photographic Society.

At the meeting of this Society on May the 20th—M. Léon Foucault in the chair—M. the Count de Sevastianoff presented to the Society a volume of photographs of manuscripts of the Convent of Mount Athos. This volume contains a geography of Ptolemy of the twelfth century (text and plates). Count Sevastianoff reported to the Society the interesting work which he had already accomplished in this direction. He possessed already more than fifteen hundred negatives, which he had been enabled, by a new process, to remove from the glass and to fix on to paper. The thanks of the Society were voted to Count Sevastianoff for the volume with which he had presented them.

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* Sur les Variétés Indigènes du *Fucus Vesiculosus*, par J. Kickx, Prof. à l'Univ. de Gand, Membre de l'Acad. Royale des Sciences, &c., Bruxelles. Hayez, 1856.

Dr. Valtier mentioned to the Society an interesting fact which he had remarked, and which bore upon the researches of Moser, Nièpce de St. Victor, &c. A positive proof, obtained in the ordinary way, and not fixed, having been left in contact with several nitrated sheets, superposed one on the other, he observed, not without astonishment, upon taking up these papers after the lapse of some time, that the image of the positive was reproduced with diminishing intensity, not only on the first of the superposed sheets, but actually upon four or five of the following ones. Dr. Valtier, at the time when he had observed this fact, placed in the hands of M. Laulerie, the Secretary of the Society, two of the sheets thus compressed, to illustrate his communication. Unfortunately, during the month which had elapsed since giving in his communication, these sheets had turned quite black, and the phenomenon observed by Dr. Valtier could not be seen. The Society thanked the Doctor for his communication.

M. Girard announced that he ought, at this meeting, to present, in the name of M. Davanne and himself, the continuation of their "General Investigation on Photographic Positive Proofs" (chapter on Fixing); but a circumstance had prevented them from completing their memoir in time, and they were therefore obliged to delay the publication till a future occasion. Nevertheless, in order to secure the date of publication, they thought it would be useful to inform the Society of an interesting fact which they had discovered, and which they thought was of great importance to the theory of fixing.

"There is not a photographer who has not been struck with the curious phenomenon which is produced on positive prints at the moment when, removed from the pressure frame, they are immersed in the fixing bath. Then, in fact, the proof, which is of a dark violet tint, suddenly seems to unveil itself, and the tint changes to a red coloration, of variable strength, but of perfect sharpness. This phenomenon had hitherto been explained by the decomposition of a subchloride of silver existing on the sheet on removal from the copying frame; but the theory of a subchloride having been upset by MM. Davanne and Girard, they saw the necessity of seeking another cause for the phenomenon.

"Remembering that, in the course of their researches, they had constantly seen these red colorations arising from a combination between the reduced nitrate of silver and the size, they thought that there undoubtedly lay the explanation of the phenomenon. Reflecting, likewise, on the nature of the fixing agents employed, such as hyposulphite of soda, ammonia, cyanide of potassium, &c., they remarked, that all these substances possessed an alkaline reaction. Now, we all know that the alkalies have the property of swelling up—that is to say, of bringing to a kind of imperfect solution those substances usually employed for sizing, and especially starch. It therefore appeared to them reasonable to suppose that, at the moment of immersion in the fixing bath, this exerted upon the size its alkaline reaction, swelled it up, or, in other words, caused it to undergo an incipient solution, and consequently rendered it fit to combine with the reduced nitrate of silver, which it could not previously do, owing to these bodies being all in the solid state.

"If the above hypothesis is true, an experiment ought easily to determine its correctness. It was easy, in fact, to find in the vapour of boiling water a substance which, incapable of giving rise to any chemical action on the salts present, could, nevertheless, exercise on the size the same *swelling* action as an alkali; and, consequently, upon exposing to the vapour of boiling water a violet proof taken upon starched paper, and just removed from the copying frame, we ought to see it immediately take the red tint, which it would have acquired if it had been immersed in a solution of hyposulphite of soda. On the other hand, the same proof, plunged into cold water, should not sensibly change, for cold water does not cause starch to swell in a sensible manner.

"Experience has proved the truth of this. A proof on paper sized with starch, removed from the printing frame and plunged into cold water, does not sensibly change in tone; but it passes immediately to red if it is plunged into boiling water, or simply exposed to the vapour of this liquid.

"Is this the only cause? Is the phenomenon of the change of tint of proofs complicated by accessory phenomena? This is what the authors have established in their forthcoming memoir. At present they are satisfied with making known the preceding fact, which appears to them to be of importance in the theory of fixing.

"Moreover, they have established that all salts having an alkaline reaction, such as phosphate of soda, borax, &c., act in the same way as the ordinary fixing agents, but with less energy."

At the conclusion of this communication, M. Girard performed before the meeting the above mentioned experiment, and immediately produced the red colour by exposing to the vapour of boiling water a violet proof which had just been removed from the printing frame, and furnished by M. Disderi.

M. Arnaud mentioned a fact that appeared to him to bear upon the preceding communication. He had frequently seen proofs, taken on English paper (that is to say, gelatinised), which, when left for some time immersed in water, acquired the red tint which the fixing agents ordinarily produce.

M. Girard observed that this fact, as had been judiciously observed by M. Arnaud, bore upon the preceding facts. In truth, English papers are sized with gelatine, and gelatine, as was known, swelled up in cold water, although slowly. Consequently, these proofs when left for some time in contact with cold water, are met with in the same chemical conditions as are the proofs on starched paper when exposed to the vapour of boiling water.

M. Léon Foucault thought that, besides the change of tint which had been mentioned, there was another point which deserved equally the attention of experimentalists. He had always seen that the tones of proofs underwent, when immersed in the fixing bath, a diminution of intensity, which should undoubtedly be attributed to the influence of the re-agent employed.

M. Girard replied, that M. Davanne and himself are equally engaged upon this point; and that, in the memoir which they should have presented upon that day to the Society, they had established the value of the different fixing agents used, according to the energy with which they could (technically speaking) redden the tones of proofs.

The Society thanked MM. Davanne and Girard for their communication.

M. Poitevin communicated to the Society a note on a new method of obtaining positives without the employment of salts of silver. (See p. 210.)

In illustration of this process, M. Poitevin placed before the Society several proofs taken by its means.

The Society thanked M. Poitevin for his communication.

A letter from M. Migurski, of Odessa, was read, relative to a collodion process which he found very successful.

The meeting then adjourned.—*Condensed from the Bulletin of the French Photographic Society.*

Miscellaneous.

THE STEREOSCOPIC EXCHANGE CLUB.

We have had some complaints on the subject of the stereograms, sent in exchange for others, not being so good as they ought to be. That these complaints have been so few is a proof that, on the whole, the exchange has been conducted in a satisfactory manner; but still it is desirable that we should repeat that in an arrangement of this kind, where each person must necessarily depend to a great extent on the honour of the other, the utmost care ought to be observed not to send a picture which the sender would not himself like to receive in exchange for a good one of his own. We have no doubt that in some cases where it has occurred that the picture sent has been an indifferent one, that it has arisen, not from any wilful desire on the part of the sender to get a good picture for a bad one, but from his ignorance of what constituted a good picture. Many of those, no doubt, who have availed themselves of the facilities we have given for forming a varied collection of stereograms in place of the otherwise limited number they could possess by their personal exertions, have been beginners. We arrive at this conclusion because it would be absurd to suppose that a man would deliberately send prints from a bad negative if he possessed a good one, even supposing him to be devoid of all pride as an artist. Real photographers will not, therefore, judge such persons harshly, even if they cannot feel themselves justified in sending good pictures in exchange for rubbish; although we are aware that, at least, two of the gentlemen whose names appear in the list have done so on two or three occasions, rather than lay themselves open to the suspicion of being wanting in good faith. The immediate cause of these remarks is a letter signed "Fair Play," who forwards us two very indifferent pictures, which have been sent to him unmounted, with a request that he would exchange. If "Fair Play" had forwarded us his name we could have dealt with the matter in a more satisfactory manner; at present we are quite unaware how they came to be sent to him. If his name is on the list, why did he not forward it to us instead of signing his letter "Fair Play?" If, on the other hand, he wishes us to suppose that the name of the person who sent them is on the list, let him send us his name, and we will take steps to ascertain the truth, and prevent his continuing in a position to give any further trouble.

Photography Applied to Musketry.—A series of interesting and valuable experiments have been made during the last few days, by Lieutenant Walker, 79th Highlanders, of the School of Musketry Staff, Hythe, in the application of the photographic art to the science—for such it has become—of musketry, with a view of obtaining, by means of the former, a true and exact copy of the target practice of a section, or any other number of men at one or more targets. We are glad to learn that these experiments have been attended with a most satisfactory result, Lieutenant Walker having established by them the important fact that, by means of the chemical influences of light, every "hit" or impingement of a bullet, however slight, can be transferred from the target to paper with an infallible accuracy and a celerity which at once renders obsolete the former tedious and, oftentimes, inaccurate method of copying by the hand the impression made by each shot on the target's surface into a diagram, which had previously to be prepared for the purpose. This novel adaptation of photography will be found peculiarly useful in testing the comparative merits of different fire arms; and in these days of volunteer rifle corps it would prove highly useful and interesting if each company had a photograph taken of its target practice; and, as any falsification of returns would by this plan be rendered impossible, on a great comparison being made of them throughout the country, it would at once be seen to which corps belonged the palm for the best shooting.—*Hythe Gazette.*

Gas Jets made of Steatite.—The metallic jets used for gas lights have the disadvantage of rapidly oxidising, and consequently deteriorating; those of porcelain become porous, and it is on that account that it has been recently proposed to make them of steatite or soapstone. M. Schwartz, of Nuremberg, prepares them with an artificial steatite made of 30 parts of magnesia, 6 of silica, 3 of oxide of iron, and 5 of water. Then he cuts it into small rectangular pieces, which are heated in a muffle for five hours, commencing with a moderate heat, so that the water may evaporate without causing the stone to crack, and afterwards raising them to a higher temperature. The gas jets are then manufactured from these pieces, they are immersed in a bath of boiling oil until they become black, they are then polished with a piece of linen, and the operation is complete. After being used four or five days these jets undergo no further alteration, and the orifices or holes through which the gas escapes remain without varying in size.

Photographic Notes and Queries.

WHITE POSITIVES ON GLASS.

Sir,—Paradoxical as it may appear, yet I feel assured that one of the great impediments to photography is that insatiable desire to discover something new, instead of improving and perfecting the good we have. My attention has been called to this fact by the stir which has lately been made by the different new processes; and again, in No. 38 of the "News," p. 135, we have a paper read before the French Photographic Society on "A Method of Obtaining Pure Silvery Whites in Collodion Positives" by the addition of a large proportion of sulphuric acid to the developer. This, however plausible it may read, I feel assured is a step in the wrong direction, as it is not metallic brilliancy and consequent hardness that we want; but rather a clear but *lustreless* white, with the most gradual change to deep shadows, which latter should be *absolutely* transparent; this can be obtained by a slight modification of the old formula of sulphate of iron, acetic and nitric acids, whilst with sulphuric acid you get such brightness as to be quite offensive. In fact, some time ago a friend of mine was induced to purchase one of the advertised formulas, which proved similar to the one now under consideration, and though it gave good whites, they were far too metallic, and they had the peculiar property of radiating, as it were, into the shadows. Thus, the shirt-front of a male sitter would have a white radiation or halo run on to the vest, and even on to the coat, and this happened so frequently that he was forced to abandon it. A similar result will occur if you use *too much* nitric acid.

The theory of the changes in developing, as given by MM. Davanne and Jouet, appears to be tolerably correct; but they appear to forget that only a small portion of the sulphate of iron is decomposed, the effect of using strong solutions being merely to insure the rapid substitution of fresh particles for those which have undergone decomposition, while, if we use too much acid (it not being a neutral compound), it has an action of its own, which is always an impediment to the development, and, as I have shown, injurious to the picture. In the developer we use there is but a quantity of 3 minims of nitric acid to the pint, and we find it amply sufficient to produce the desired effect. MM. Davanne and Jouet, as chemists, ought to have recollected that in the decomposition of the free nitrate of silver, which is on the surface of the plate, that nitric acid is liberated, which, with the small amount in the developer, is sufficient to prevent the molecule of iron being deposited with that of silver, as the slight excess of the acid will always insure its immediate conversion to nitrate of iron. I feel sure that if photographers would be more uniform in their use of formulæ, much better results would be arrived at. As it is not safe to send you a glass positive, I send you a transfer from the glass, in which, though the whites suffer a little in the transferring, still I think it will abundantly bear out the justice of my remarks. In conclusion, I may add that the formula we use is,—

Protosulphate of iron	400 grains.
Glacial acetic acid	¾ ounce.
Nitric acid	3 drops.
Rain water	1 pint.

The protosulphate may be increased about 50 grains in cold weather, and diminished a like quantity in hot weather, at the fancy of the operator. If with such a formula operators would pay proper attention to the arrangement of the light, and care in using their materials, I do not think we should hear much more of "redeveloping." J. Walter.

[The transfer seems very good; and we shall be glad to receive from Mr. Walter the description of the process by which it is effected.—Ed.]

REMOVAL OF SILVER STAINS.

We extract the following from *La Lumière*:—

"As an amateur photographer, I attach a high importance to the power of removing silver stains from the hands. All the methods of accomplishing this I have met with hitherto, are either inefficacious or the substance used is dangerous; hence I am induced to bring to your knowledge a process I have discovered for removing the stains, which leaves nothing to be desired. The process is as follows:—

"Take a little chloride of lime, put it in a dish or capsule, pour a few drops of water upon it—just sufficient to reduce it to a paste. If the stains are freshly made, they will disappear immediately on rubbing them with the paste, and the skin will be as smooth and soft as before it was stained, and will not retain the slightest trace of the discoloration. If the stains are of old date, they will require longer rubbing, and if they resist that, a few drops of hydrochloric acid may be added to the chloride of lime. However, it is hardly necessary that I should trouble you about old stains, inasmuch as no person will allow them to get old. Neither is it necessary that I should give chemical reasons why this effect should result from the use of chloride of lime. I beg you will give me your assistance in making my discovery public. —Accept, &c., "Ponçon."

DIMENSIONS FOR A COPYING CAMERA.

Sir,—Would any of your readers kindly give me the dimensions of a copying camera for a 2½-inch focus double combination lens. The glasses are ¾ of an inch diameter. I want to enlarge small pictures 2 inches square to about 10 × 8. I fancy that the lens should be about 5 or 6 inches from the small transparent negative, and about three times that distance from the focussing screen, but of this I am not certain, and should be very glad of assistance or information on the subject. Capt. S. S. B.

[The above distances are very near the correct ones, and might easily be verified or corrected by a few preliminary trials with a lamp and a screen. Possibly, however, some of our readers may have in use a similar apparatus. In this case, if they would favour us with a few practical data, it would be of more use than any theoretical directions we might give.—Ed.]

DIPPING BATH FOR COLLODION PLATES.

Sir,—Noticing in the "Photographic News" that you are proceeding with a series of articles on "Amateur Mechanics," perhaps the following method of making a dipping bath may be worth the notice of your readers. Some time ago I bought a gutta percha tray, the proper size for the plate to be excited, say 12 × 10, and cut off one of the ends, then I took a piece of crown glass, rather larger than the inside of the dish, say 12¼ × 10¼, heated the edges of the tray in a pan of boiling water, and laid the glass (having previously ground the edges about the eighth of an inch) on the dish and pressed the gutta percha over the edge of the glass, so that it was quite firm and water-tight. Then I took a thin piece of wood, and fastened it to the back of the bath with the liquid glue, and then hinged another piece of wood to it to form a support. I have found it answer extremely well. The dipper is easily made. D. L.

MEDIUM-COLOURED BACKGROUND.

Sir,—After many inquiries, I have failed to meet with a suitable material for a medium-coloured background which may be rolled up for portability. If any of your readers can put me in the way of obtaining or preparing such an one, it will confer a favour. G. S.

ANSWERS TO MINOR QUERIES.

Mounting Glass Positives.—*E. O. S. P.* Your positives have irretrievably suffered by exposure to the chemical vapours which you say are frequently evolved in the room where they are kept. You should have cemented the protecting glass on to them, and not trusted to merely placing them in contact. Proceed as follows:—Place the positive face upwards on the table, on that place the gilt mat, and then the piece of plain glass to protect the surface (be sure that the two glasses are as nearly as possible the same size), and fasten the whole tightly together by means of a strong india rubber band drawn across in one direction. Then cut four slips of gold-beater's skin a little longer than the four edges of the plates and about half an inch wide, take up the picture, mat, and glass together, and having moistened one edge, apply it on a strip of gold-beater's skin, and rub it well down on the edge, back, and front with the finger, taking especial care that the skin adheres well to the *edges*. Next, repeat the operation with the opposite side of the glass, and place on one side till dry. Then remove the india rubber band and place it across the plate in the opposite direction, so as to leave the uncemented edges at liberty; and, having fastened down neatly the surplus skin at the corners, repeat the process at the remaining two sides. When quite dry the skin which laps over the front of the glass can be removed by gentle friction with a fine file; and then, after giving the skin a coat of varnish, the picture will be securely protected against the deleterious effects of the atmospheric impurities.

Gutta Percha in Collodion.—*An Anxious Amateur.* In the early days of the collodion process, Mr. Fry recommended the addition of gutta percha to collodion as a means of greatly increasing the toughness of the film. *An Anxious Amateur* will find that if he put a few square inches of thin gutta percha foil into an ounce or two of collodion, that after standing for a few days, although the collodion will not have apparently dissolved much, yet the collodion will have acquired the increased toughness about which you inquire. Mr. Howlett, speaking of this method, says—"The best way is to put some of the very thin gutta percha into a bottle, and then add some ether, and allow it to stand for two or three days. A very small quantity will have dissolved, and quite sufficient to produce a very strong film upon adding one drachm of the solution to each ounce of collodion."

TO CORRESPONDENTS.

Bungib.—The correspondent (Θ) who favoured us with the process at vol. i. p. 86, has given some more complete and fuller instructions at the commencement of our second volume. In the absence of the print, which you say you inclosed as a specimen of your failure (but which did not reach us), we can only recommend you to read and put into practice the fuller directions above mentioned.

C. S. W.—If the negatives have been varnished, the cracks may have arisen from the varnish having been of an inferior quality. We have lost several negatives ourselves from that cause. If they split up before varnishing, the fault was in the pyroxyline being too contractible: this may be remedied by iodising with iodide of potassium, and keeping till the collodion is slightly red, or by adding more alcohol. Several notices of this fault have appeared from time to time in our pages, and you cannot do better than consult them.

Michael O'L.—1. Canvas may be prepared with the same solutions as paper, by either the calotype or positive printing process. The canvas should be stretched on a frame, and the solutions applied with a brush, with the exception of the fixing and washing. 2. It is very doubtful whether a large, cheap, single lens will take a portrait or group of still life with any satisfaction to the photographer; but as you intend to paint over the photograph in oil colours, great perfection is not needed.

J. W.—1. The size of the glass room must entirely depend upon the expense you wish to go to. Do not have it smaller than will be needed for the lenses and cameras you intend to work with. One 20 feet long, 12 feet wide, and 10 feet high, with a ridge and furrow roof, will be convenient for ordinary work. 2. Perhaps your bath is too acid. The spots may be avoided by allowing the collodion to thoroughly settle before using. 3. Neither of the lenses are what might be considered first-rate.

J. W. Coffin.—You will most likely succeed in cleaning your daguerreotype by one of the methods recommended in our recent numbers.

Artizan Amateur.—1. Allow a solution of cyanide of potassium (an ounce to a pint) to stand in the gutta percha dish for some hours: at the end of that time the stains will in all probability be removed. Then wash, and after rinsing out with dilute nitric acid (1 part to 5 of water), well wash with water. 2. Sensitising in a 30-grain bath would make the process much better. You can try adding a fourth part of alcohol to each of the baths—trying the effect of one before commencing with the other. In so purely an experimental trial, we cannot give very trustworthy advice. 3. Use 10 grains of gelatine to the ounce: it may be put in the iodising solution. 4. Yes, the formula for aceto-nitrate of silver given will do. 5. About equal parts. It will keep for months, in solution, in a good corked bottle. 6. We have never heard of such a cause of failure before; but it is very likely that the distilled water was the cause, as it had a strong smell. 7. Citric acid would not have produced the effect. 8. Negatives may be left after fixing in brine as long as you like, provided you keep them dry, and do not expose them to the light. 9. A little salt in the iodising bath is a great improvement in the calotype and wax paper process. It may be one-fifth the quantity of the iodide present. 10. You will not be able to conveniently prepare the salts you mention by adding weighed and calculated quantities of the acids and bases together; your best plan will be to add solutions of the acids to the alkalies, and bring the mixture quite neutral by means of test papers. 11. Your precipitate is not tartrate of soda, but bitartrate of soda—a salt containing two equivalents of acid to one of base. We have not seen the pamphlet.

B. H.—1. Rubbing well with a wash leather and whitening will answer best. 2. The collodion is made of methylated alcohol instead of pure spirit. There is no remedy but getting better collodion.

Erratum.—Page 192, line 22 from top, for "hypo." read "pyrogallic acid."

Communications declined, with thanks.—F. R. S. O.—Xylo.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Vanitas Vanitatis.—C. O. S. O.—X

In Type:—Jesse Harding.—F. L.—J. Jopling.—J. F.—Artizan Amateur.—H. T. T.—W. Boyer.—G. H. W.—Peter Positive.—Viator.—A Bathonian.—M. M. D.—R. M. S.—H. and J. Walter.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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ON PHOSPHORESCENCE, FLUORESCENCE, &c.

BY PROFESSOR FARADAY, D.C.L., F.R.S.

We have great pleasure in laying before our readers the following official report, by Professor Faraday, of his lecture on the above subject, delivered at the last meeting of the Royal Institution :—

"The agent understood by the word 'light,' presents phenomena so varied in kind, and is excited to sensible action by such different causes, acting apparently by methods differing greatly in their physical nature, that it excites the hopes of the philosopher much in relation to the connection which exists between all the physical forces, and the expectation that that connection may be greatly developed by its means. This consideration, with the great advance in the experimental part of the subject which has recently been made by E. Becquerel, were the determining causes of the production of this subject before the members of the Royal Institution on the present occasion. The well-known effect of light in radiating from a centre, and rendering bodies visible which are not so of themselves, as long as the emission of rays was continual—the general nature of the undulatory view, and the fact that the mathematical theory of these assumed undulations was the same with that of the undulation of sound, and of any undulations occurring in elastic bodies, were referred to as a starting position. Limited to this effect of light it was observed that the illuminated body was luminous only whilst receiving the rays or undulations. But superadded occasionally to this effect is one known as *phosphorescence*, which is especially evident when the sun is employed as the source of light. Thus, if a calcined oyster-shell, a piece of white paper, or even the hand, be exposed to the sun's rays, and then instantly placed before the eyes in a perfectly dark room, they are seen to be visible *after* the light has ceased to fall on them. There is a further philosophical difference, which may be thus stated: if a piece of white oyster shell be placed in the spectrum rays issuing from a prism, the parts will, as to illumination, appear red, or green, or blue, as they come under the red, green, or blue rays; whereas if the phosphorescent effect be observed, *i.e.*, that effect remaining after the illuminating rays are gone, the light will either be white, or of a tint not depending upon the colour of the ray producing it, but upon the nature of the substance itself, and the same for all the rays. The ray which comes to the eye in an ordinary case of visibility, may be considered as that which, emanating from the luminous body, has impinged upon the substance seen, and has been deflected into a new course, namely towards the eye; it may be considered as the same ray, both before and after it has met with the visible body. But the light of phosphorescence cannot be so considered, inasmuch as *time* is introduced; for the body is visible for a time sensibly after it has been illuminated, which time in some cases rises up to minutes, and perhaps hours. This condition connects these phosphorescent bodies with those which phosphoresce by heat, as apatite and fluor-spar; for when these are made to glow intensely by a heat far below redness, it is evident that they have acquired a state which has enabled them for a time to become original sources of light, just as the other phosphorescent bodies have by exposure to light acquired a like state. And then again there is this further fact, that as the fluor-spar, which has been heated, does not phosphoresce a second time when reheated, still it may be restored to its first state by passing the repeated discharge of the electric spark over it, as Pearsall has shown. Then follows on (in the addition of effect to effect) the phenomena of *fluorescence*, and the fine contributions to our knowledge of this part of light by Stokes. If a fluorescent body, as uranium glass, or a solution of sulphate of quinine, or decoction of horse-chestnut bark, are exposed to diffuse daylight, they are illuminated, not merely abundantly but peculiarly, for they appear to have a glow of their own; and this glow does not extend to all parts of the bodies, but is limited to the parts where the rays first enter the substances. Some feeble flames, as that of hydrogen, can produce this glow to a considerable degree. If a deep blue glass be held between the body and the rays of the sun, or of the electric lamp, it seems even to increase the effect; not that it does so in reality, but that it stops very many of the luminous rays, yet lets the rays producing this effect pass through. By using the solar or electric spectrum, we learn that the most effectual rays are in most cases not the luminous ones, but are in the dark part of the spectrum; and so the fluorescence appears to be a luminous condition of the substance, produced by dark rays which are stopped or consumed in the act of rendering the fluorescent body luminous: so they produce this effect only at the first or entry surface, the passing ray, though the light goes onward, being unable to produce the effect again; and this effect exists only whilst the competent ray is falling on to the body, for it disappears the instant the fluorescent substance is taken out of the light, or the light shut off from it. When E. Becquerel attacked this subject, he enlarged it in every direction.[*] First of all, he prepared most powerful phosphori; these being chiefly sulphurets of the alkaline earths, strontia, baryta, lime. By treatment and selection he obtained them so that they would emit a special colour: thus, seven different tubes might contain preparations which, exposed to the sun, or diffused day-light, or the electric light, should yield the seven rays of the spectrum. The light emitted generally possessed a lower degree of refrangibility than the ray causing the phosphorescence; but in some instances he was able to raise the refrangible character of the ray emitted to that of the exciting ray. By taking a given preparation, and raising it to different temperatures, he caused it to give out different coloured rays by the single action of one common ray; this variation in power returning to a common degree as the temperatures of the phosphori became the same in all. He showed that *time* was occupied in the elevation of the phosphorescent state by the ray; and also that time was concerned in various degrees during the emission of the phosphorescent ray: that this time, which in many cases was long, might be affected, being shortened by the action of heat, and then the brilliancy of the phosphorescence for the shortened time was increased. He showed the special relation of the different phosphori to the different rays of the spectrum, pointing out where the maximum effect occurred; also that there were the equivalents of dark bands, *i. e.* bands in the spectrum, where little or no phosphorescence was produced. These phosphori were many of them highly fluorescent. Thus, if one of them was exposed to the strong voltaic light, and then placed in the dark, it was seen to be brilliantly luminous, gradually sinking in brightness, and ultimately fading away altogether; but if it were held in the rays beyond the violet end of the spectrum (the more luminous rays being shut off) it was again seen to be beautifully luminous, but that state disappeared the instant it was removed from the ray. Now this is fluorescence, and the same body seemed to be both phosphorescent and fluorescent. Considering this matter, and all the circumstances regarding time, Becquerel was led to believe that these two luminous conditions differed essentially only in the *time* during which the state excited by the exposure to light continued; that a body being really phosphorescent, but whose state fell instantly, was fluorescent, giving out its light while the exciting ray continued to fall on it, and during that time only; and that a phosphorescent was only a more sluggish body, which continued to shine after the exciting ray was withdrawn. To investigate this point he invented the *phosphoroscope;* an apparatus which may vary in its particular construction, but in which discs or other surfaces illuminated by the sun or an electric lamp might, by revolution, be rapidly placed before the eye in a dark chamber, and so be regarded in the shortest possible space of time after their illumination. By such an apparatus Becquerel showed that all the fluorescent bodies were really phosphorescent; but that the emission of light endured only for a very short time. An extensive series of experimental illustrations upon the foregoing points was made with fine specimens of phosphori, for which the speaker was indebted to M. Becquerel himself. The phosphoroscope employed consisted of a cylinder of wood, one inch in diameter and seven inches long, placed in the angle of a black box with the electric lamp inside, so that three-fourths of the cylinder were external, and in the dark chamber where the audience sat, and one-fourth was within the box, and in the full power of the voltaic light. By proper mechanical arrangements this cylinder could be revolved, and the part which was at one instant within, rapidly brought to the outside, and observed by the audience. As the cylinder could be made to revolve 300 times in a second, and as the twentieth part of a revolution was enough to bring a sufficient portion of the cylinder to the outside, it is evident that a phosphorescent effect which would last only the 1,3000th or even the 1,6000th of a second might be made apparent. All escape of light between the moving cylinder and the box was prevented by the use of properly attached black velvet. The cylinder was first supplied with a surface of Becquerel's phosphori. The effect here was, that when by rotation the part illuminated was brought outside the box, it was found phosphorescent. If the cylinder continued to rotate it appeared equally luminous all over, and when the rotation ceased, or the lamp was extinguished, the light gradually sank as the phosphorescence fell. Then a cylinder having a surface of quinine or æsculin was put into the apparatus. Whilst the cylinder was still it was dark outside; but when revolving with moderate velocity it became luminous outside, ceasing to be so the moment the revolution stopped. Here the fluorescence was evidently shown to occupy time; indeed, the full time of a revolution: and taking advantage of that, the self-shining of the body was separated from its illumination within, and the fluorescence made to assume the character of phosphorescence. Another cylinder was covered with crystals of nitrate of uranium, a hot saturated solution having been applied over it with a fine brush. The result was beautiful. A moderate degree of revolution brought no light out of the box; but with increased motion it began to appear at the edge. As the rapidity became greater, the light spread over the cylinder, but it could not be carried over the whole of its surface. It issued as a band of light where the moving cylinder left the edge of the box, diminishing in intensity as it went on, and looking like a bright flame, wrapping round half the cylinder. When the direction of revolution was reversed, this flame issued from the other side; and when the motion of the cylinder was stopped, all the phenomena of fluorescence or phosphorescence disappeared at once. The wonderfully rapid manner in which the nitrate of uranium received the action of the light within the box, and threw off its phosphorescence outside, was beautifully shown. The electric light, even when the discharge is in rarefied media, or as a feeble brush, emits a great abundance of those rays, which produce the phenomena of fluorescence; but then if these rays have to pass through common glass, they are cut off, being absorbed and destroyed even when they are not expended in producing fluorescence or phosphorescence. Arrangements can, however, be made in which the advantageous circumstances can be turned to good account with such bodies as Becquerel's phosphori or uranium glass. If these be enclosed within glass tubes, having platinum wires at the extremities, and which are also exhausted of air and hermetically sealed, then the discharges of a Ruhmkorff coil can be continually sent over the phosphori, and the effects both fluorescent and phosphorescent be beautifully shown. The first or immediate light of the body is often of one colour, whilst on the cessation of the discharge the second or deferred light is of another; and many variations of the effects can be produced. In connection with rarified media it may be remarked, that some of the tubes by Geissler and others have been observed to have their rarified atmospheres phosphorescent, glowing with light for a moment or two after the discharge through them was suspended. Since then Becquerel has observed that oxygen is rendered phosphorescent, *i. e.*, that it presents a persistent effect of light, when electric discharges are passed through it. I have several times had occasion to observe that a flash of lightning, when seen as a linear discharge, left the luminous trace of its form on the clouds, enduring for a sensible time after the lightning was gone. I strictly verified this fact in June, 1857, recording it in the *Philosophical Magazine*,[*] and referred it to the phosphorescence of the cloud. I have no doubt that that is the true explanation. Other phenomena, having relation to fluorescence and phosphorescence, as the difference in the light of oxygen and hydrogen exploded in glass globes, or in the air, were referred to, with the expression of strong hopes that Becquerel's additions to that branch of science would greatly explain and extend them."

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[*] *Annales de Chimie et de Physique*, 1859, tome lv. p. 1.

THE GENESIS OF PHOTOGRAPHY: ITS INVENTION IN ENGLAND.

It has been truly observed that the invention of most subjects connected with art or science, is veiled in obscurity. Thus, the real inventor of typography is not accurately known, and this only relates to the art of printing as invented and practised in Europe, while the Chinese block-printing belongs, probably, to a very remote period of history.

It is different with photography, the idea of which sprung, Minerva like, from the brains of one man; and it is in England where this art has been discovered. We have received the following account from the lips of the late *Francis Bauer*, botanical painter to Kew Gardens, brother of the still more known Ferdinand Bauer, painter to the great Australian expedition under Captain Flinders, R. N.

M. Bauer's account was the following:—

"It was at an early period of the present century, that M. Nièpce called upon me, showing me some specimens of an engraving or drawing, the correctness of which was astonishing, but the nature and process of which I could not guess. As M. Nièpce spoke much of the importance of his invention, I induced him to address a memoir on the subject to the Royal Society of London, of which I then was not yet a member. M. Nièpce, in doing so, only alluded in general terms to his invention, but did not like at once to disclose the preparation of the plate, &c. On this ground the Council of the Royal Society took exception, and answered, that as there was a *secret* implied in the invention of M. Nièpce, they could not take any cognizance of it." And there the matter ended!

Now, it can easily be understood that a respectable learned body could not well entertain any secret relating to a quack medicine, &c.; but why photography had to be comprehended in a similar ban, is difficult to guess. M. Nièpce, therefore, left England. But I think that even Daguerre never questioned the priority or contemporaneity of M. Nièpce's invention, who also, or his relicts, received some recompense from the French Government. Such, however, were the reasons why photography (heliography) has become a French, and not an English invention. As the originals of the application to, and correspondence of M. Nièpce with the Royal Society of London, must be still in existence in Burlington House, their publication will much interest the many admirers of heliography, the early history of which art has now become of great interest. We may learn, then, which we could not otherwise, what were the first and genetic ideas and intentions of M. Nièpce in London, about 1813.

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[*] *Philosophical Magazine*, June, 1857, p. 506.

Thus things stood when N. Nièpce de St. Victor (a nephew of the inventor of photography) published his first work: "*Traité pratique sur la gravure heliographique.* Paris, 1856." It appears from the preface, that the first experiments on the subject were made as far back as 1813—probably the period alluded to by R. Francis Bauer. M. Nièpce, jun., does not say anything about the application of his uncle to the Royal Society of London—either not been aware of anything of the sort having taken place, or treating the affair as antiquated and of no further consequence.

This incident affords us an opportunity of comparing the activity of the Royal Society of London with that of the Institute of France (*Acadamie des Sciences*) in Paris, and what chances they offer respectively to fostering and introducing great inventions in science and the arts. The Institute of France, established during the Great Revolution of 1790, was, probably, laid out on a freer basis than the Royal Society of London, founded so long previously. Bonaparte, who was an ordinary Member of the Mathematical Section, was in the habit, when First Consul, of assisting at the ordinary meetings quite *sans façon.* The revolution of 1830 added a new department to the French Institute, *la section de la morale et politique.* All this extended and expanded the activity of the neighbouring Society; large prizes were founded by Government and private bequest, &c.; and thus, then, the Institute of France is that body, before whose tribunal now every invention, every improvement, every new plan is brought; sure to meet with a competent and really impartial decision. The *Comptes Rendus,* and the detailed reports of their meetings (the anniversary being open to the public), have made the Institute a truly national, we may say, European establishment, and thus a repetition of the *rebuque* given to the inventor of photography could not and would not occur. Still, as the Fellows of the Royal Society, and other high patrons of science, have now even established a fishing club on a charming site of the *Thames,* it is to be supposed that they will henceforth take a more *current* and enlivened view of inventors and *innovators.*

J. L——Y.

67, *Drummond-street, Euston-square.*

INDELIBLE POSITIVES.

BY M. LAFON DE CAMARSAC.

LONG before the progress realised in this direction by other photographers, the gentleman whose name appears at the head of this article was struck with the luminous idea of substituting for the reduced silver or other matter which forms ordinary photographic positives, different substances applied in a state of powder, which should render them indelible, with or without the aid of fire. In giving a summary of the lucid exposition of the French Photographic Society, we referred to the beautiful enamels exhibited by M. Lafon, in concert with M. Disdéri; recently, this distinguished photographer called upon us for the purpose of showing us these magnificent carbon positives, which we briefly noticed in our last number. Rejoicing in this brilliant result, which gave us an opportunity of doing justice to a hard-working experimentalist of whom no mention was made by M. Paul Perrier in his report, we begged M. Lafon de Camarsac to draw up a note stating the bearing of his discovery. This note has just reached us, and we publish it for the benefit of our readers, simply calling their attention to the fact that it opens quite a new field to photography:—

"At the commencement of the year 1855, in a memoir presented to the Academy of Sciences at its sitting of the 11th of June, an analysis of which was published in *Cosmos* of the 29th of the same month, I detailed processes which enabled me to form the heliographic image in very different materials. The colouring substances chosen according to the taste of the operator, were in reality substituted for the photogenic matter and fixed on glass, porcelain, enamel, metals, ivory, paper, and wood. Proofs formed of oxides of copper, iron, manganese, cobalt, gold, and silver, fixed on glass and enamel by fusion in a muffle furnace, presenting, with the certain guarantee of permanency, a great variety and very brilliant colour, were placed before the members of the Academy. Pursuing for many years past the problem of the perfect fixing of the image, I, at that epoch, approached it from its most difficult side, but, at the same time, the most conclusive, by producing images incrusted by the action of fire in ceramic substances, the duration of which is indefinite. Though many interesting applications of my discovery have presented themselves to my mind since then, I felt that I must before all other things seek to improve the optical character of the image, to simplify the practical operations, and the solution of the problem of curved and irregular surfaces of the objects operated upon, and also to experiment on the colouring pigments relative to their stability, and the method of fixing them on different objects. These improvements being absolutely necessary before attempting to apply it to the arts and manufactures, have occupied my attention up to the present moment.

"*Substances which bear the image; agents of colouration:*—Soft porcelain, enamel-paste, and crockery. The image is formed of metallic oxides, and fixed in the muffle furnace. Hard porcelain, biscuit, hard enamel, glass and crystal. The metallic oxides are strengthened with their fluxes, and fixed in the muffle furnace. If the biscuit is to receive a glaze, I use cobalt and the other colours employed in the hottest furnace. On these different substances, whether white or coloured, I also form the images in gold, or in silver strengthened with their fluxes. I fix in the muffle furnace. I preserve the deadness of the metal in the second case; in the first, I burnish.

"*On Silver.*—The image is made in gold, or by the combination of silver and lead used in enamel work. I fix in the fire. Papers, parchment, gelatine, ivory, wood, prepared linens, &c. The image is formed with any colouring substance, and I fix it with gum, albumen, size, oil, varnish, or encaustic. On these different coloured substances, images may also be formed in silver, gold, or bronze.

"The colouration with vitrificable colours has no limit except the palette itself of coloured enamels. With papers it may be varied *ad infinitum.* In both cases, as regards delicacy and homogeneity of appearance, there is no objection to forming the images of a mixture of colouring substances, having regard, as respects vitrificable substances, to the laws which preside over their combination under the influence of fusion.

"All the images I have mentioned may be drawn with the pencil. The image may also, within certain limits, be obtained *photographically* in varied colours. This is of importance to the final colours of the proof, because the painter has not in this case to struggle against the monotony of the ground; he finds under his pencil a sketch coloured with a view to the final harmony of the picture; he may henceforth attain the richest of tones, without danger of injuring the invaluable design made by the light by imparting it.

"Whatever may be the object on which it is desired to obtain the image, this image may always be composed of the most permanent materials. The appearance of deadness, or lustre, of plating or gilding, and of colouring, may be conferred according to the purpose to which the object is destined. These results are attained on all objects, whatever their form. The photographic problem thus finds its complete solution:—

"*In vitrifiable substances or mixtures of metals:* by furnishing an admirable decoration to the ceramic and glass arts, to jewellery, and the greater part of the manufactures which employ the first substances.

"*In the case of ivory, prepared wood, cotton fabrics, &c.:* by substituting beautiful designs for the rude drawings so generally employed in the manufactures which employ these materials.

"*In the case of paper with the image in carbon, or any other substance not easily alterable:* by enabling museums to enrich their collections in various ways, with galleries of illuminated portraits, the reproduction of grand scenes, unimpeachable documents for history, book illustrations, &c. These processes, so fruitful in result, were described by me in 1855, and, as I think, have given rise to the carbon and other similar processes which are relatively quite new. They have received many improvements in other hands since that time; but the principle remains the same, and I think in photography it is definitive.

"The images I can produce are so perfect that *I reproduce as a negative on glass, waxed paper, and with carbon,* a negative with all the delicacy and vigour of the original."—*Cosmos.*

THE ACTION OF ACID LIQUIDS ON GUTTA PERCHA BATHS.

BY ALEXANDER WATT.

Of the "many ills which" photography "is heir to," I believe none to be so frequent or objectionable as that which is dignified by the term "fogging."

Whether fogging of the plates arises from light entering the dark room or camera; from impurity of any of the chemical substances employed; from over-exposure, or from any other cause, it is equally unpleasant and annoying; and as we photographers are all engaged in a pursuit which will probably ever be an experimental one—for there are so many circumstances which prevent our reducing the operations to a positive certainty—I think all will agree that, by making known the results of our own practical experience in any way, we may confer benefit upon each other and the profession at large.

One of the causes of "fogging," which has given me great annoyance, has been *the action of the exciting solution upon the gutta percha bath;* and this has occurred very frequently, but more especially when the nitrate has been in an acid state.

In many instances I have left the bath in splendid working condition up to the latest hour in the evening, and when I have resumed my labours on the following morning, to my inexpressible dismay, I have found it utterly impossible to take a clear picture. Being perfectly certain that there was but one cause for this change—namely, the leaving the exciting solution in the gutta percha bath during the night, I next turned my attention to restoring the solution to good working condition. I therefore added a few drops of glacial acetic acid, which had little or no effect. I now added about a drachm of the acid, and sensitised a plate, when I found an evident improvement, but it was not until I had added more than two drachms of acetic acid to the 20 ounce bath that it was in good condition, and then it certainly did yield most brilliant, clear, and intense negatives.

It is generally found that acetic acid produces a retarding action when employed in large quantities in the bath, but this I did not find the case when the bath was in the condition referred to. On the contrary, each time I added fresh acid I observed a remarkable improvement in the sensitiveness of the bath, for the exposure required in the camera was reduced from about 20 seconds to 2 seconds at farthest, with the addition of a stop.

Feeling satisfied that it would be unwise to allow the acetic nitrate to remain in the gutta percha vessel after I had done with it, I transferred it to a bottle, and the next day it worked as well as ever. This, also, clearly proved that the gutta percha had been the cause of fogging in the first instance.

Some time after this, I again omitted to bottle the bath after using it; and, as before, the next day it proved quite impossible to take a negative, as the plate became fogged all over, in fact, as much so as if I had developed in open daylight. I therefore applied the usual remedy—acetic acid. I at once boldly added 2 drachms of the acid, and a visible improvement showed itself; but this time it was not until I had added *nearly an ounce* of acid that the bath worked well; and this time, as before, the bath was very sensitive.

At last, some days after this, I found that when the aceto-nitrate had been in the bath for two or three hours, or even less, it gradually began to produce foggy negatives, and each time I was obliged to add more acid, until I had in the 20 ounces of solution nearly *three ounces* of acetic acid. Although the bath would work well then, I found that it was impossible to depend upon it, and I felt satisfied that the more acetic acid I had in the solution—although it enabled me to obtain good pictures for a time—the more susceptible it was of being influenced by the gutta percha vessel.

By this time I vowed vengeance against all gutta percha baths and their manufacturers, and this was not the first time I had had occasion to regret employing gutta percha vessels in chemical operations. Some years ago, I had used a large wooden tank, lined with gutta percha, for the purposes of electro-plating, and when the solution of cyanide of silver had been in this bath for a few months, I found that the solution had become much injured by the action of the cyanide of potassium upon the gutta percha; and at last the solution became spoiled, and I was obliged to precipitate the silver, by sulphuric acid, for the purpose of separating it from foreign matter. When the acid was added to the cyanide of silver, a substance in large clots arose to the surface, which, on being heated, proved to be *gutta percha.* This substance, held in solution by the cyanide, was liberated or disintegrated by the sulphuric acid. I mention this circumstance to show that gutta percha is not, as we have been led to suppose, a harmless material to make chemical vessels of, and I should strongly advise all photographers to avoid placing an aceto-nitrate solution in a bath made of this material, although I believe, by this time, the advice to be like informing a man that Queen Anne is dead; however, there are still some persons, probably, who may receive the recommendation with benefit.

From the facts above recorded, I am led to believe that it is the acetic acid, and not the nitrate of silver, which acts upon the gutta percha: for when a neutral bath, or one which is only faintly acid, is employed—as such a bath would be when newly prepared—it may remain in the gutta percha vessel for months without producing foggy pictures: this I have proved over and over again, I think, most satisfactorily. And, as I have before stated, I have found that the greater the amount of acetic acid in the bath, the more easily was it influenced by the gutta percha vessel.

But it did seem strange that, up to a certain time, the compound of gutta percha and acetic acid, which I imagine existed in the bath, was favourable to sensitiveness, and to giving good intense negatives. Now, whether the presence of a *little* organic matter, held in solution by acetic acid, in the bath, would prove serviceable or not, I should be afraid to say, but I am rather disposed to think that it would be serviceable, more especially if the exciting solution were kept in a glass or porcelain vessel, where it would undergo no further alteration from foreign matter.

I am disposed to think, also, that an exciting bath which had begun to fog from being kept in a gutta percha vessel, would, if acetic acid were added to it until it produced clear pictures, and the bath were then transferred to a glass or porcelain vessel, it would continue to work well under such circumstances. But I do not feel sufficiently certain upon this point to assert it as a fact.

In conclusion, I would prefer working with a glass or porcelain bath, fitted with a "jacket" of gutta percha, which would not only keep out the light, but protect the glass from injury.

THE PRODUCTION OF PICTURES BY MEANS OF IODINE AND GUAIACUM RESIN.[*]

BY L. E. JONAS.

The property of vapours of iodine when they pass over any surface, of depositing themselves in the form of fine crystals of iodine upon all elevations, has been employed by the author in producing impressions of lithographs, &c. If a picture of this kind be exposed to vapour of iodine, and then pressed upon a paper moistened with tincture of guaiacum, a blue copy is obtained. To produce a good result, the following things are requisite:—

1. A paper of peculiar strength, evenness, firmness, and smoothness, and quite free from starch.
2. An alcoholic solution of guaiacum, which especially possesses the property of acquiring a blue colour (1 part of resin and 32 parts of alcohol).
3. The maintenance of a definite degree of moisture at the moment of pressure, and the coating of the paper with the solution of guaiacum.
4. Powerful pressure upon the original, which must be sufficiently iodised to allow the iodine to penetrate the paper.

The more delicate and clear the picture or writing which is to be copied, the better is the result; other objects which present distinct elevations and flat surfaces may be printed from by suitable arrangements; this is especially the case with parts of plants, as in the well-known nature-printing. —*Journal für Prakt. Chemie*, lxxv., p. 244.

HELIOGRAPHIC ENGRAVING IN RELIEF.

Having already described M. Berschtold's process of engraving in detail, there is no necessity for our describing it anew, but we may mention that he has made another step in advance. The roundness, or, as artists term it, the model, being due to the difference in the number and arrangement of the lines, it occurred to M. Berschtold that by using a negative as a type, the plate might be bitten into to a sufficient depth to make an engraving in relief, like an engraving on a wood block, without interfering with this model. We are told that he has succeeded in engraving in this way a plate with the bust of the Empress Eugenie, from which proofs have been printed typographically with the same facility as from wood.

Critical Notices.

Stereograms of Dovedale, &c. By Mr. W. Woodward.

If a foreigner, who was desirous of seeing some of the most picturesque spots in this country, were to ask what part of England we considered best calculated to give a good idea of our landscape scenery, we should say, almost without hesitation, Dovedale. It is well known that Derbyshire is considered one of the most beautiful counties in England, on account of the varied character of its scenery—so bold, yet so enchanting. There are, probably, more beautiful pieces of landscape scenery, of the truly English class, to be seen in Derbyshire than anywhere else in the United Kingdom. But the most beautiful portion of that county is Dovedale. To the photographer who is desirous of obtaining good landscape views, it is invaluable, as he can scarcely place his camera in any position without securing a good picture. Mr. Woodward, however, seems to have been most careful in the selection of his pictures. His views of those places which are well known, have been taken in most instances from the best possible position. The consequence is, that the views before us are the most artistic that we have seen for some time. They rise far above the ordinary class of landscape slides which we have seen, and to persons desirous of possessing really good landscape pictures, we can most conscientiously recommend them. In regard to the photographic manipulation, they bear the traces of the same careful treatment which marks Mr. Woodward's productions. While the printing is admirable and exceedingly uniform, they are rich in tone and clear in definition; there is an absence of the leaden cold tone which too often disfigures stereoscopic landscape views. Apart from the pleasure and instruction which slides of this class must give to the general public, we think that they are calculated to be of great use to the artist as studies. Every one of the pictures before us would make the groundwork for exquisite landscape pictures, and had they only colour they would be certain to attract great attention as artistic in selection of site. "The Needle Rocks," and the "View from Lovers' Leap," are two charming pieces of landscape scenery, and are, perhaps, the best in the series. The other views chiefly consist more or less of river scenery, which are very cleverly given; perhaps the least successful is the rock called "Dovedale Church," owing to the large mass of white which is in the centre of the picture, and again, the abrupt effect which is produced by stopping out the sky. In the other river views the effect has been much more ably rendered than in the slide above alluded to; the reflections in the water and the distant half tints, combined with the greatest delicacy of detail, make them very beautiful views. These views are respectively called—"View near the Entrance to the Dale," "The Stret Rock," "The Twelve Apostles," "The Pickerill Tor;" the first-named contain very many beauties, both artistic and photographic, as also does the "Twelve Apostles." In fact, it is almost useless to institute comparisons between the different slides, seeing that so much depends upon the character of the view to be rendered. In taking views of this high class, Mr. Woodward is doing good service to photography, by raising it from the degrading position to which some would-be artists are attempting to drag it.

Dictionary of Photography.

Efflorescence.—Some salts when kept in a dry atmosphere crumble to powder, losing the whole or part of their water of crystallisation, while in a moist atmosphere they may be preserved unchanged. This phenomenon is called efflorescence.

Electro-Silver Plating.—The art of covering a metallic plate with a surface of silver by means of the galvanic battery. In order to insure a perfectly pure surface of silver many operators deposit a thin film on the daguerreotype plate by the galvanic battery; this is a good plan, and well repays the additional trouble by the superior brilliancy of the proofs obtained. The apparatus necessary is a small galvanic battery and a jar of suitable size and shape. The jar is filled with a solution of—

Cyanide of potassium	2	ounces.
Water	20	ounces.
Oxide of silver	½	ounce.

As soon as the cyanide and oxide are dissolved, the liquid is ready for use. A piece of silver should be placed in the solution jar, and connected by means of a wire with the negative (zinc) pole of the battery; another wire with a clip at one end to hold the plate is attached to the positive pole. The plate to be silvered should be perfectly cleaned and polished, and when attached to the clip plunged into the silver solution opposite to the silver foil, and suffered to remain until the desired quantity of silver is deposited upon it; it should then be taken out, washed with clean water, and cleaned and polished as before.

Equivalents, Table of.—In our "Chemistry" we gave a table of the equivalents of those elementary bodies which are most frequently met with in works on photography or general science. Since then several alterations and amendments have been introduced into the equivalent numbers of many of the elements. We give below a complete list of the elementary bodies as at present known, together with the symbols by which they are designated in chemical language, and their equivalents or combining proportions, compiled from the most recent trustworthy authorities:—

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[*] From the *Chemical Gazette.*

Aluminium	Al	=	13·75	Nickel	Ni	=	29·5
Antimony	Sb	=	122	Niobium	Nb		
Arsenic	As	=	75	Nitrogen	N	=	14
Barium	Ba	=	68·5	Norium	No		
Beryllium	Be	=	6·9	Osmium	Os	=	99·5
Bismuth	Bi	=	210	Oxygen	O	=	8
Boron	B	=	11	*Palladium*	Pd	=	53·3
Bromine	Br	=	80	Pelopium	Pe		
Cadmium	Cd	=	56	Phosphorus	P	=	31
Calcium	Ca	=	20	*Platinum*	Pt	=	98·7
Carbon	C	=	6	*Potassium*	K	=	39
Cerium	Ce	=	47	*Rhodium*	R	=	52·2
Chlorine	Cl	=	35·5	*Ruthenium*	Ru	=	52·2
Chromium	Cr	=	26·7	Selenium	Se	=	39·75
Cobalt	Co	=	29·5	Silicium	Si	=	14
Copper	Cu	=	31·75	Silver	Ag	=	108
Didymium	D	=	50	Sodium	Na	=	23
Erbium	E			Strontium	Sr	=	43·75
Fluorine	Fl	=	19	Sulphur	S	=	16
Gold	Au	=	197	*Tantalum*	Ta	=	184
Hydrogen	H	=	1	Tellurium	Te	=	64·5
Ilmenium	Il			Terbium	Tb		
Iodine	I	=	127	*Thorium*	Th	=	59·6
Iridium	Ir	=	99	Tin	Sn	=	59
Iron	Fe	=	28	*Titanium*	Ti	=	25
Lanthanium	La	=	47	Tungsten	W	=	92
Lead	Pb	=	103·5	*Uranium*	U	=	60
Lithium	Li	=	6·5	*Vanadium*	V	=	68·6
Magnesium	Mg	=	12	Yttrium	Y		
Manganese	Mn	=	27·5	Zinc	Zn	=	32·75
Mercury	Hg	=	100	*Zirconium*	Zr	=	22·4
Molybdenum	Mo	=	48				

The equivalent numbers of those elements which are in *italics* are doubtful, as they have not been the subject of very recent investigation.

Ether.—Ether is a colourless, transparent, and very mobile liquid, evaporating with the greatest facility, boiling at 96° Fahrenheit, and having a specific gravity of 0·72. Its vapour is excessively heavy and pours like water; it is very inflammable, and when mixed with air and ignited it explodes with violence, and may thus give rise to serious accidents. On this account, great care should be taken, when considerable quantities of ether are being transferred from one vessel to another (as in the preparation of collodion), that no fire or burning body is near; and any stock of this liquid should be kept in a safe place away from the laboratory. Ether, when volatilising, produces considerable cold, and for this reason the under surface of the glass when being coated with collodion becomes covered with a mist arising from the condensation of the aqueous vapour. When preserved in an imperfectly stoppered bottle, ether absorbs oxygen and becomes acid from the production of acetic acid; this attraction of oxygen is increased by elevation of temperature. Commercial ether often contains a large amount of alcohol and water. The presence of the former body may be recognised by shaking a certain quantity of ether in a tube with its own bulk of water and allowing the mixture to separate again into two layers: if there is no alcohol present, the volume of the water ought only to increase very little; it augments in bulk, as the ether contains more alcohol. The presence of water is ascertained by placing in a stoppered bottle ether and a little dried chloride of calcium, which dissolves in proportion to the quantity of water present. For photographic purposes ether should always be washed with water to separate the alcohol from it, and afterwards be rectified over some substance having an affinity for water, in order to render it perfectly anhydrous. The formula of ether is C_4H_5O.

Evaporate.—To pass off in vapour; to convert a fluid into vapour.—*Spontaneous* evaporation is the term applied to the gradual drying up of most liquids when exposed to the air, and is in contradiction to the more violent and rapid process of evaporation by ebullition.

(*To be continued.*)

The Amateur Mechanic.

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GUTTA PERCHA—*(continued)*.

In the amateur's first attempt at manipulation, he should be content with producing something simple and easy to manage. A dish or tray, for instance, will present few difficulties. There are two or three modes of making these, which we will describe. The first we will give in the words of Mr. Osborn, of Birmingham, who recommends it to his photographic brethren as an easy and effective method:—"I first mark out the size of the dish I want on a piece of hard wood about a quarter of an inch or half an inch thick; from this mark I then cut the wood with an outward bevel; the bevel must then be smoothed with sand-paper, and all the sharp edges taken off. I then made a frame of wood like boy's slate frame, but bevelled inwards, this is fastened on a smooth slab of wood, and the mould is complete; I then cut off from a sheet of thick gutta percha, a piece rather larger than will cover the hole in the frame; I soften it in boiling water, and having wetted the mould, place the softened sheet over the hole, and press the block in its place with some force; allow the gutta percha to cool and harden, then trim the edges, and you will have a very neat and light dish for any purpose required." This method whilst, doubtless, efficient so far as the result is concerned, has the drawback of being somewhat troublesome, the labour of preparing the mould, unless several dishes of the size are required, certainly exceeding the value of the result, if the manipulator's time be valuable. The use of "hard wood" for the mould also seems unnecessary, as it increases the labour without giving additional value to the result; wood with a smooth grain would be necessary to secure neatness; but this may be secured in wood comparatively soft and easy to work: perhaps a piece of pine would answer the purpose best.

Another method involving less trouble, but requiring a little care in manipulating in order to secure neatness, is as follows: procure a piece of wood the size of the inside measurement of the dish required; if for a half-plate size, the wood should be about 7½ inches by 5½ inches, and about three quarters of an inch thick; finish it as smoothly as possible: the edges, which are to form the mould for the bottom of the dish, should be neatly rounded off, and the corners treated in the same manner. This is to serve as a mould; if required, a projection of the requisite shape may be left at one corner to form a lip or spout from which to pour; this will, however, increase the trouble of making the mould, and the same result may be produced in a simpler manner, which we will describe in its place. A piece of sheet gutta percha from one-sixth to one-fourth of an inch thick is to be cut of the proper size. Here we must digress a few moments to speak of a peculiar characteristic of gutta percha, which will at this stage of the process often embarrass the amateur somewhat.

It would seem a simple thing enough at first sight to cut a piece the proper size and shape; for the size of which we are speaking, 7½ inches by 5½ inches, with three quarters of an inch for the depth of each side, would give the required size of the piece of sheet as 9 inches by 7 inches. Having cut a piece of this size, however, and placed in water of the requisite heat, our amateur will be astonished to find it in a few moments changing its shape; possibly, from nine inches in length it rapidly extends to ten, eleven, or twelve inches, and at the same time from seven inches in width, it contracts to four or five inches; or the contraction and expansion may be in the other direction, the length decreasing, and the breadth increasing, so that the oblong is rapidly changed to a square. This characteristic seems to arise from the fact that gutta percha in the process of rolling into sheets acquires a fibrous character, as may readily be seen by examining a piece of the very thin sheet, a strip of which will resist very considerable tension when pulled in the direction of the fibre, that is the direction in which it was rolled; but the slightest tension in the opposite direction is followed by a rupture, dividing it again into narrower slips. Under the action of sufficient heat to render it plastic, this fibre contracts in length, and expands, in like proportion, in breadth; this takes place without any material alteration in thickness. It will be seen, then, that before cutting a piece of any required size for manipulation, it is important to ascertain the direction of the fibre: this may generally be done by observing its appearance, the surface of the sheet generally showing a slight trace of grain or texture in the direction in which it has been rolled. If any doubt exists it may easily be set at rest by cutting a small piece, marking its relation to the length and breadth of the sheet, and immersing it in boiling water; the contraction in one direction and expansion in the other, which will rapidly take place, will indicate the direction in which it has been rolled. In cutting a piece for the dish, it will be necessary to allow a little additional length in the direction of the fibre which will run up, and to cut it a little less, in the opposite direction, which will expand. The exact amount of such allowance must be ascertained by experience, which will easily be attained in one or two experiments.

Having cut a piece the proper size and shape, or at least which will become so when heated, a large vessel of hot water should be at hand. To avoid the chance of any water being absorbed, it should never be suffered to reach a boiling heat. Water boils at 212° Fahr.; for this purpose it should not exceed 200°, nor should it be allowed to fall below 140°, as below that heat the gutta percha ceases to be sufficiently plastic. If a thermometer be not at hand, a sufficiently near approximation will be obtained by taking the water from the fire at boiling heat and pouring it into a vessel for use; the heat it will part with by doing this, will reduce it to about 200°, from which it will rapidly fall in a minute or two to about 150°, just allowing time for the immersion and softening of the gutta percha before it is too cold. The piece of gutta percha now thoroughly softened, must be quickly lifted from the water and placed on the mould in the right position. The mould should be previously made wet to prevent the gutta percha from adhering; soap and water are used for this purpose by the Gutta Percha Company. The edges should then be pressed down with the fingers, carefully working the plastic mass with the fingers and thumb round the corners of the mould; unless some skill and attention are used here there is danger of working it too thin and losing strength at the corners. If the manipulator has been dexterous, he will have succeeded in working the softened sheet into the required shape before it has cooled; if any part be uncompleted when the gutta percha has ceased to be sufficiently soft and tractable, that part only may be again dipped into sufficiently hot water and worked to the proper shape. In a few minutes it will be cool and hard, and may be removed from the mould. The edges should be trimmed with a sharp knife, the blade of which should be dipped in water to prevent the bite of the gutta percha on its surface. A lip may be given to any of the corners by slightly softening in the hot water and working it to the proper shape with the finger and thumb.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 12th July, 1859.

Photographic news is rare in Paris at the present moment; last Sunday week we had 32° (centigrade) in the shade, whilst at Madrid about the same date they had only 29°, and hot weather is prejudicial to hard work. Some of the papers are only just beginning to publish M. Perier's report on the Duc de Luyne's prize, which your paper published nearly a month ago. If anything new comes out in France, it is generally known in England about a fortnight or so before the French know it themselves!

At Paris we have a M. Lafon de Camarsac, who believes himself to be one of the first—if not the first—who discovered the carbon process, which has excited so much attention lately. In a day or two I shall forward to you a proof obtained by this gentleman, that you may judge to what perfection he has pushed this new method of photography. How M. Lafon has been so backward with regard to the Duc de Luyne's prize, I cannot explain. It would appear, however, that though his method of operating was published in the *Comptes Rendus* of the Academy of Sciences here, as early as 1855, he, unfortunately, had not applied it to produce *carbon* proofs, but only to different coloured pigments, such as red ochre, oxide of cobalt, manganese, &c., with which he produces proofs of all kinds of colours, somewhat in the style of those exhibited this year by M. De Beauregard, which I mentioned in my letters concerning the Exhibition of Photography. M. Lafon is the author of those curious photographs on porcelain and on enamel, which figured at the Exhibition in M. Disdéri's case, and which I spoke of in my former letters, as being produced by Disdéri. The *Cosmos* of this week gives a long article, which will doubtless appear also in your columns, on the positives obtained by M. Lafon.

The same paper publishes a new memoir by M. Edmond Becquerel, on certain phosphorescent effects: it forms the continuation of the article published a few weeks ago in the "Photographic News;" and embodies a mass of experiments on the light emitted by bodies after they have been exposed to the sun, or after they have been rendered luminous by electricity.

M. Poey has sent from Havana two long papers, on the colours of stars, planets, &c., according as they are viewed at the horizon or at the zenith. If his observations are exact, it would appear that a star viewed at the horizon has a red tint, which is replaced successively as the star rises in the heavens, by orange, yellow, green, blue, indigo, and finally, when at the zenith, or its greatest elevation, violet. The zenith point once past the star undergoes an inverse colouration as it descends towards the west, and sets with the red tint it had on rising.

These observations appear probable enough; but it is not so of those inserted in the second paper, in which the colouration of the borders of the planetary solar and lunar discs are studied. If the sun or the moon, for instance, be viewed when the atmosphere is very dense, the lower border appears of a red tint, the superior one of the complementary colour—violet. When the luminary is about half-way between the horizon and the zenith, it presents, according to M. Poey, the whole seven colours of the spectrum, divided into two groups, which are separated by a central band of pure white light. I am tempted to believe that these results are due to an optical illusion. If the moon is viewed through the hand, as we sometimes view a picture, or through a small paper tube, one of the arcs of its disc will appear of a reddish colour, the opposite one taking the complementary blue or violet, and, by a little manœuvring with the tube, it is not difficult to make first one border and then the opposite one take the red or the violet hue.

Boëttger has published the following receipt for making liquid glue, which may, perhaps, be found useful in the *atélier* of a photographer. For some time past a species of liquid glue has been known in commerce; it is obtained by treating common glue or gelatine with nitric acid. But nitric acid is dear and poisonous; it may be dispensed with. According to Boëttger, it is only necessary to dissolve the glue in very strong vinegar with the aid of the water bath, a fourth part of alcohol and a little alum being added to the other ingredients. The product remains perfectly liquid, and is exceedingly useful for glueing small objects of ivory, bone, horn, wood, &c. I do not think Boëttger is the author of this discovery, as I have frequently bought, in Paris, liquid glue smelling strongly of vinegar.

M. Pelouze has referred again to a discovery formerly made by Braconnot, the once celebrated chemist of Nancy, viz., that strong mineral acids may be used to convert starch, wood, linen, &c., into sugar. This discovery of Braconnot's is largely applied, in this country, in the manufacturing of wine. When the juice of the grape does not contain enough sugar to produce a wine strong in alcohol, sugar made from potato-starch is added and submitted to fermentation. M. Pelouze says that paper, linen, woody fibre, &c. will dissolve in a few minutes in hydrochloric acid. If, immediately after the dissolution is accomplished, water is added, the whole of the cellulose dissolved is precipitated in a pure state; but if the solution has been allowed to stand for 24 hours or so, it is found that the entire quantity of cellulose has been transformed into glucose or grape-sugar. The same author thinks that if the phenomena which take place during this transformation were properly studied, it would lead us to solve the problem of converting woody fibre into an alimentary substance.*

A late number of the *Annali di Chimica*, of Milan, publishes, without any author's name, a new method of obtaining *caffeine*, the active principle of coffee *and tea* (for theine and caffeine are looked upon as one and the same substance). This method consists in treating finely-pulverised coffee with benzine, such as is sold in commerce to clean gloves, &c. Benzine dissolves the essential oil of the coffee and the caffeine. The liquid is then evaporated, and the two substances, the oil and the caffeine, are easily separated by boiling water, which dissolves the latter, whilst the oil floats on the surface of the water. The aqueous solution, when evaporated carefully, gives beautiful crystals of caffeine, which may be, moreover, thoroughly purified by sublimation.

At the last meeting of the *Scientific Congress of Carlsruhe*, of which Professor Nicklès, of Nancy, has given us such a delightful account in his little *brochure* published a short time ago, Boettger repeated the curious experiments which illustrate Albert Fuchs' discovery of the effects of electricity on small columns of water. If a small jet of water be passed through an aperture so small that a pressure of 12½ inches only causes it to rise 28 inches high, the jet is divided into a considerable number of small drops which fall very near the aperture, and describe parabola having a very small parameter. If now any substance electrically excited, for instance, a glass tube that has been rubbed with silk, be brought within a short distance of the jet, the drops disappear and the water is discharged in a continuous column, even to the top. If the excited substance be placed very near, the jet is dispersed in excessively fine drops; if the glass tube is held near the top of the jet, the drops unite into larger ones, and if it be advanced towards the basis of the jet, the height of the little fountain is considerably diminished. A jet of water, suitably arranged, can be made to acquire an extraordinary electric sensibility, greater even than that of a gold-leaf electrometer. Fuchs caused the jet to assume a continuous form, by placing himself about 12 inches from it, and simply passing his hand through his hair for a short time. The distinguished professor explained these curious phenomena in the following manner:—

The dispersion in drops of the original jet is the purely mechanical effect of the adhesion of the water to the sides of the aperture, combined with the greater freedom of motion possessed by the molecules of water placed in the axis of the jet. If the electrical bodies be removed to a distance, the molecules, in a separated, isolated, and neutral state, are electrified by influence, and, by virtue of the polarity thus acquired, attract each other and unite to form a continuous column. If, on the other hand, the excited material be placed near the jet, the entire mass of the water is strongly electrified by the *same kind* of electricity, and, consequently, the drops of water repel each other, for electric repulsion is now added to the mechanical dispersion caused by the aperture.

You would laugh heartily if you only knew to what a climax the discussion as to the possibility of the resuscitation of dead—or apparently dead—animalculæ has been pushed within the last few months in France. Here is the actual state of the question:—

It would appear, from some old experiments made by Spallanzani, that certain *Rotifera* and *Tardigrades* can be completely dried up, so as to resemble a grain of flint or an atom of hard, dry parchment, and yet, when moistened with water, the animalculæ are restored to life! M. Doyère, of Paris, repeated these experiments with success many years ago, and the fact was looked upon by naturalists—even by the great Humboldt—as incontestable. It has been, however, contested very sharply indeed by M. Pouchet, of Rouen, who declares, as I mentioned in my first letter to the "Photographic News," that no animalculæ, when properly dried, ever return to life. His assertions are based upon numerous observations, in which he has been aided and abetted by M. Georges Pennetier, and some other naturalists, who all declare that the motions observed in dry animalculæ, when they are moistened with a drop of water, are purely mechanical, being an effect of endosmose; the liquid is absorbed by the dried animal substance which is thereby swollen, but no vital action takes place.

M. Doyère denies these assertions, and still puts implicit faith in his former observations.

The discussion has gone so far that the naturalists of the Rouen Museum have offered a prize of 500 francs to be awarded to the person who shall be able to resuscitate a dried animalculæ!

At this juncture M. Davaine, a naturalist of high standing, has endeavoured to prove that the animalculæ in question must be divided into two sections perfectly distinct: the one, composed of those *Infusoria* which inhabit our stagnant waters, and which are, consequently, always imbibed or saturated with the element in which they live; the other, embracing those animalculæ which are to be found in the gutters, on the roofs of houses, in bunches of moss, &c., and which are naturally subject to be dried up every now and then by the sun's rays, from want of moisture in the localities they inhabit. According to M. Davaine, the former section cannot be submitted to dessication without losing their lives; but the latter, especially those taken from the roofs of houses (which were those experimented upon by Spallanzani), may be submitted to a temperature equal to that of boiling water, and return to life again on being moistened.

Up to the present time, however, the question is far from decided, one way or the other; the discussion still continues. We all await anxiously its result.

[With respect to the carbon printing process alluded to in the second paragraph of the above letter, we may add that we have received a carbon picture from our Paris correspondent, which was handed to him by M. Lafon de Camarsac. The picture in question is a portrait of a young French lady, and the manner in which it is reproduced is quite astonishing. The lights and shadows are rendered with the most perfect delicacy, and in a manner which could not be surpassed by the silver process. Every wave of the hair is depicted with the most extreme accuracy; the eyes are full of intelligence, and every feature is given with a minuteness which we never saw surpassed. At the time when so much was said about a carbon process which had been discovered, we pointed out that, judging from the specimens of carbon printing exhibited, it would be impossible to print a satisfactory portrait from a negative by its means, the coarseness of the carbon preventing the proper rendering of the half-tones. That we were right in this opinion may be inferred from the fact that no such picture has been exhibited; but that carbon can be employed in such a way as to give the most satisfactory results, is amply proved by the portrait before us. It is evident that M. Lafon gave his entire attention to the production of the portrait, without paying very much regard to the accessories, or he would have insisted on a reduction in the amplitude of the skirt of the dress, which detracts from the otherwise graceful posé of the sitter, and is made more manifest than it might be under other circumstances from the contrast it presents to the slender figure of the lady. What M. Lafon's motive may have been for not competing for the Luyne's prize we are unable to say, but we have no sort of doubt that if the print forwarded to us is a fair average specimen of those taken by his process, that he will stand first at the next competition, unless great improvements are made in the processes hitherto published.—Ed.]

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* These phenomena have of late years been subjected to investigation by Dr. T. L. Phipson, of Paris, in his work *De la Force Catalytique, &c.*, to which a gold medal was awarded last year by the *Société Hollandaise des Sciences*, of Haarlem, and previously in his *Memoire sur la Fécule et les Substances qui peuvent la remplacer dans l'Industrie* (Bruxelles, 1855-6).

A PHOTOGRAPHIC TRIP UP THE WYE.

Sir,—At the present moment, the most interesting subject to photographers is the consideration where they shall spend their holiday, and I think, therefore, I shall be doing them a kindness by sending you for publication an account of my trip up the Wye, which I think will be sufficient to prove that of all places in the kingdom there is none which offers more advantages to the photographer than this.

The beauty of the scenery on the Wye is so well known by reputation, that it is unnecessary to dilate upon it; I shall, therefore, confine myself chiefly to those objects which struck me as being sufficiently remarkable to be photographed.

Instead of coming down the river, as is the ordinary practice, I decided on sailing up it, as I was not quite sure that time would allow me to visit all the interesting places on the river, and my friend, whose boat I borrowed, had told me that the best subjects for photographs were to be found near its mouth. The mention of a boat need not induce your readers to imagine that such conveyance is absolutely necessary; it is no doubt an advantage, and, at times, advisable, but there are paths alongside the river nearly all the way. I may mention, too, before I go farther, that the cheapest, and, as I think, the best way of reaching the spot, for him who starts from London, is to go by the excursion train to Bristol, and then he will be able to get across to Chepstow without difficulty, and commence his upward journey.

Chepstow itself being the beginning of my journey, I was rather more lavish of my plates than I should probably have been if it had been the termination of it; but I am glad of it now, as the trouble is forgotten and the negatives remain. The old castle was the first object which attracted my attention; of this I took three views—one of the arched entrance, including the two large round towers and a portion of the ruins on either side, one of the opposite side, and the third of the end which approaches the cliff, on the top of which I placed my camera. I have always considered that the pleasure one derives from the possession of a picture is greatly enhanced where a legend or a historical recollection is associated with it. Thus the negatives of these ruins remind me of the time when the castle was besieged by the parliamentary forces under Cromwell, in the time of Charles I., when a small body of royalists defended it against them until nearly a third of their number, including their commander, was killed, and the remainder all but starved. The keep is generally called Marten's Tower, from the circumstance that Marten, who was one of the judges who tried Charles I., was imprisoned here after the restoration, for twenty years, until he died, when his body was laid in the chancel of Chepstow church, until one of the vicars, feeling greatly scandalised that a regicide's bones should rest so near the altar, had them taken up and buried in the nave. I tried to take a picture of the cliff and a part of the ruins from the river, but failed to get one that was satisfactory, in consequence of the slight motion of the boat.

We left our apparatus in the care of the boatman while we visited the grounds of Piercefield, as it was getting too late to think of taking a picture, and, moreover, the view, though most beautiful to the eye, is not calculated so well for a photograph. Nothing can be more delightful than the walk along the paths on the top of the cliffs. The sun was getting low when we commenced our walk, and no words can express the beauty of the views, which extended for miles. The scenery through which the river takes its course was bathed in as rich hues as ever met the eye in an Italian landscape; and every now and then as the path wound along, near the top of the cliff, we caught glimpses of a scene diversified with the ruins of the castle, or the town itself with the bridge and port and the large vessels which lay stranded therein, left there by the receding tide, which I was told rose here to a height of fifty feet.

It was getting dark when we reached the end of our walk in these grounds, so we deferred our visit to Wyndcliff until the next morning. Partly, perhaps, from our not seeing them under the garb of sunset, they did not strike us as being equal in beauty to those of Piercefield, but they are, nevertheless, of wondrous beauty. There is one view in special which I would advise none of your readers to miss seeing who may decide on going to this part, and that is the view from the highest cliff, which is little less than 800 feet high. It is said that from it you obtain a view which includes portions of nine counties; of the truth of this statement I can say nothing, except that it struck me as being very likely. On the one hand, we could see the estuary of the Severn with the country beyond, and the whole of Chepstow and the ruins of the castle, with the cliffs and woods of Piercefield. In another direction we could follow the course of the Wye through a less rich country, the background of which was formed by the dark mountains, forming a view of quite a different character to the first, beside many other views varying in their general features, but remarkable for their beauty.

After drinking some water in the little moss-covered cottage at the foot of the steps which lead to the summit of the cliff, we returned to our boat and sailed slowly up the river until we neared Tintern Abbey. To take a picture of this far-famed spot was, of course, a predetermined resolution, so while my friend remained to take care of the boat, the boatman loaded himself with my apparatus, and we proceeded to the Abbey. No matter from what point of view you look at the ruins, it is worthy of being photographed, and I hardly know any place which furnishes prettier pictures for the stereoscope. I took several negatives, and among them were some for the stereoscope, which I prize very highly, two of which are pictures of the interior of the ruins. I worked here four hours, and am more satisfied with the results of my labour than with the results of any four hours' work either before or since. To see Tintern Abbey by moonlight is one of the finest spectacles the eye of man ever rested upon, and we were fortunate enough to obtain this view: for feeling that I had done quite enough for one day, we decided on staying where we were for the night, and visiting the ruins after we had dined, and I would recommend any photographer, who happens to be there when there is a moon, to do likewise.

On leaving Tintern we did not stop, except to take an occasional picture, until we reached Monmouth. The distance by land is, I believe, not more than five miles, but it is considerably more by water, I imagine, judging from the time it took us to get there. The town of Monmouth itself only yielded two good negatives, one of which includes the remains of the old gatehouse, at the extreme end of the town; but the town is, nevertheless, very beautifully situated; and I dare say we most of us remember the enthusiastic manner in which Fluellyn speaks of it, when referring to the birthplace of Henry V., and compares it with Macedon, the birthplace of Alexander the Great:—"If you look in the maps of the world, I warrant you shall find, in the comparisons between Macedon and Monmouth, that the situations look you is both alike. There is a river in Macedon; and there is also, moreover, a river at Monmouth; it is called Wye at Monmouth; but it is out of my prains what is the name of the other river; but 'tis all one; 'tis so like as is my fingers to my fingers, and there is salmons in both." Whether the same point of resemblance still exists I can't say, but certainly "there is salmons" at Monmouth, for we had an excellent specimen of that fish at our dinner.

The day after we arrived here we hired a trap to drive over to Raglan Castle, the ruins of which are described as being very fine, and of which I hoped to get some good negatives, but, unfortunately, it began to rain in a way which compelled us to turn about and come back before we had got a mile on our journey there, and as I could not well spare another day for the purpose, I lost the opportunity of getting a picture, which I much regret.

The next morning we left Monmouth, and had the pleasantest sail imaginable along the river. The scenery, for the first two or three miles, is of that character which, to be thoroughly enjoyed, should be viewed through the smoke of the after-breakfast cigar, unless, indeed, the photographer is fortunate enough to have a fair assistant with whom he can exchange opinions, and consult as to the selection of a view. It is quiet and beautiful, and it is not until you are some distance from Monmouth that it presents an appearance which tempts you to land for the purpose of taking a picture. One of the prints which I forward to you by the same post which carries this letter will, I think, satisfy you that few places in England are better worth taking for the stereoscope or otherwise, than the Coldwell Rocks.

The grandeur and picturesque appearance of this part of the river cannot, I should think, be surpassed anywhere, not even in foreign countries, where so many English go who are almost entirely ignorant of the beauties of their native land. The picture was taken from the bed of the river, on one of the shallows of which I pitched my camera. I have three other negatives of different portions of the same rocks, but I have not yet had time to print from them, but as soon as I do so I will forward you proofs. They were not taken without difficulty, owing to the unstable character of the bed of the river, which interfered with the planting of the tripod, so as to get a perfectly level table for the support of the camera.

As my letter has already extended to some length, I shall defer the remainder until another week.—Yours obediently,

R. A. W.

Miscellaneous.

* * * * There are other aspects of this wonderful art. We may look at it from a point of view in which it will seem little else than a ghastly misrepresentation of nature, little more true in reality than was that automaton doll with an artificial voice, exhibited a few years since in London, which only sufficiently represented the sounds of the human voice to prove how immeasurably transcendent was that supple organ of natural intonation to the most refined mechanism that could be framed to imitate it. We have alluded to the great failure in the photograph in the representation of colour, however exact and minute may be its delineation of details. In point of fact, the photograph represents but two colours out of Newton's seven, and takes cognisance of but one extreme of the series of manifold lines of the rainbow. If a line of direct sunlight be admitted through a small hole into a dark room, an image of the sun will be formed on a screen at some distance from the window. If a prism be interposed in the path of the ray instead of an image of the sun, there will be an indefinite number of these as though overlapping each other and forming a long oval, each being refracted out of the direct ray a little more than the one it overlies, and each is of a different colour. Thus the red is the least diverted image, while the violet is in situation the most remote from the direction of the original ray. The bit of rainbow which these, in fact, indefinite number of successive images of the sun combine to form is the so-called *solar spectrum.* Of the whole range of its myriad lines the eye sits in judgment on a comparatively small section, the visible spectrum, extending from a deep red to the almost lavender tint, being much less than one-half of the whole; for colour is not the only attribute of the light thus analysed into its component tints; to each angle of refrangibility, indeed—that is to say, to each degree of divergence from its original direction which the several strands of the thus unravelled thread of light will take—belong a series of attributes. The radiant heat, the light, the multifarious chemical agencies seem to be but so many phases of this one wonderful vibration, which even in its invisible attributes we must include under the general name of light, or of solar radiation; and the separation of these characteristic expressions of solar force from each other is a problem which science as yet, at least, has not in any manner solved. The particular class of chemical forces that are operative in the production of the ordinary photographs resides almost entirely in the portion of the light which vibrates most rapidly, and extends when dispersed in the rainbow form from the indigo and through the violet into a long space, wherein the eye detects no light at all; so that the very light which the human eye cannot see is the illuminating influence by means of which, for the most part, the eye of the photographic camera looks out into the world. If we can picture in our imagination the effect upon our own senses of a beautiful scene which we should look on with an eye that saw not colours as we see them—to which red, and yellow, and green were as darkness, and the only apparent colours of the garb of nature were dark blue and violet, and a long range of tints passing through lavender into a series of hues that eye hath never seen nor the mind conceived of—then, indeed, we form a notion of the sort of view which the camera represents to us by the photograph. To the photographist, then, all the most luminous, the most cheerful, the most varied hues in nature, are as the outer darkness; their effect on the photographic compounds he employs is comparatively nothing; and the view his picture represents is, in fact, impressed on his sensitive surface by rays, for the most part of too high refrangibility to be visible. It is hardly strange, then, that the delicate blush-red on a lovely cheek should be in the photographic portrait as though it were a dark stain, or that the golden eye of the water-lily should come out from the collodion plate as a black mass in the midst of those snow white petals; that the primrose or the rose, "embowered in its own green leaves," should present no contrast between its petals and their lovely fringe; or, again, that the sweet "pleasant green" of foliage, that the eye so loves to dwell on, should need a prolonged exposure to afford time for the ordinary light that is dispersed from the leaf surfaces to operate the chemical change which the abundant green light itself is unable to effect. On the other hand, no one can understand, with this explanation on one's mind, why, in an ordinary photograph, a blue sky should be so intensely white, while the green tree, however brilliantly illuminated, is a black mass in comparison. Indeed, the wonder is that one can look at a photograph with any patience at all, and that we do not instinctively recognise the broad gulph between the *chiaro-oscura* of the silver picture and that of any sepia drawing that would depict with at all faithful relations of intensity the impressions made on the eye by the gradations of light as seen through the medium of colour.—*National Review.*

THE PLEASURES OF PHOTOGRAPHY.—Here is an art in which success brings exquisite enjoyment, and whose very reverses are full of interest. An art easy of acquirement—a Piërian spring, at which you may sip or quaff deeply, according to your fancy. How many a fallow brain, over which the weeds of spleen and ennui grow rank and luxuriant for very lack of employment, would again revert to profitable tillage with such a hobby to draw the plough? How many a right hand which at present knows no higher use than to be a stretcher of kid gloves, and which would draw back from the maculation of *lunar caustic*, as from contact with a plague-spot, would find its cunning, and rejoice at the discovery, as it manipulated a plate, or adjusted a focus? In this pursuit, how many a puny limb and flaccid muscle might become tough and brawny? How many a contracting chest and failing lung might experience, for the first time, the invigorating influence of that pure oxygenisation which is only to be found "over the hills and far away?" Nay, may we not even ask, How many a purposeless life, by assuming this "shadowed livery of the burnished sun," might thus find an object, and in its health-bestowing, soul-expanding service, realise the fact, that "life is earnest," and progressing always, *Excelsior, Excelsior*, go on to discover aims even higher and nobler than those which are to be found in the atelier of the sun.—*Irish Metropolitan Magazine.*

THE PRESENT HIGH TEMPERATURE.—The temperature of the last three or four days has been the highest we ever remember to have experienced. On Tuesday a black bulb thermometer placed in the sun, rose to 146°, and we were obliged to cease from our endeavours to register photographically the amount of actinic radiation in consequence of the collodion boiling on the plate,—a fact we never before met with, even when working in a close tent. On the following day the heat was even greater; the same thermometer indicating at least 10° higher in the sunshine at noon. A bottle of collodion beside it boiled violently, and a portion of it poured on a piece of metal which had been exposed for a few minutes to the direct rays of the sun hissed as if it had been poured on red-hot iron. The amount of actinic radiation on Tuesday, as far as we were able to record it, was greater than we have ever known it before. Nor is this excessive heat confined to this country; our Paris correspondent informs us that in that city in the shade, the thermometer rose to 95° on Tuesday.

Photographic Notes and Queries.

THERMOGRAPHY.—GREEN, BLUE, AND PURPLE PHOTOGRAPHS.

Sir,—Seeing a copy of your Journal, for the first time, a few days since, I found in it an article by M. Niépce de St. Victor on the power of caloric in developing photographic images. I was surprised to find that it was considered anything new, as I made the same discovery some four years since, but was not aware at that time but what the same thing had been noticed before. I was led to think, whether or no heat had not something to do with the development of images on sensitive paper, by seeing a friend who used for a hair dye a solution of ammonio nitrate of silver, hold a hot iron near enough so as not to burn the hair, which caused it to assume an intense blackness. Reasoning from this fact, I thought I would see what effect heat would have upon sensitive paper, through a negative. Having salted a paper with chloride of ammonium, and afterwards floated it upon a solution of ammonio nitrate of silver, I placed my negative upon it, and exposed it to the heat of a stove for several minutes, and on removing the negative found an image impressed upon the paper. This experiment I repeated several times, but not thinking the results so satisfactory as those by light, I gave up any further experiments in that direction, with the exception of some I made about three years since, on varnished glass plates. I found that if a glass plate be coated with varnish of any of the common hard kinds, and a negative *not* varnished be placed in contact with it, and exposed to a moderate heat for some time, that an image was impressed upon the varnished plate. I fancied that Sandarack varnish was more sensitive than others. In the same paper (No. 39, vol. ii.) I find an article, by the same gentleman, on the use of nitrate of uranium in photography, in which he shows how a green photograph may be taken. I have found that a green may be produced without the aid of chemical re-agent, but by the action of light alone, by using a sensitive paper, made after the following formula:—Take a saturated solution of bi-chromate of potassa, acidulated with sulphuric acid and a solution of ferrycyanide of potassium; mix the two solutions and let them stand a few hours to settle; then, pour off the clear liquid, and float your paper on it. When dry it will be of a light straw colour. Now, place it under your negative, and expose it (if a clear day) for fifteen minutes; remove it from your frame and wash it in boiling water, and dry. I have now in my possession prints taken thirty months ago, which have not changed in the least. The colour is like that of oxide of chromium. I have made numerous experiments with ammonio citrate of iron, which is as much superior, in my humble opinion, to all other known sensitive agents, except nitrate of silver, as the latter article is to bichromate of potassa. I have prints taken with this article which stand the test of time better than any I have ever seen by any other method. With it, and by the use of re-agents, tones and colours can be produced which I have never seen done by any other article. Thus, in a landscape, the sky can be blue or purple, giving the effects of sunset, the foliage green, and so on, according to the knowledge and skill of the operator. This was, no doubt, the manner in which prints, exhibited by Beauregard, in 1855, were done, and not, as he said, by direct printing. If you consider this from an amateur of enough consequence to print, I may, in a future paper, give you the results of my experiments with this article.

New York. Jesse Harding.

[We shall receive with great pleasure an account of our correspondent's experiments with the ammonio citrate of iron, as mentioned in the latter part of his letter. The above experiments are very curious, and will be read with great interest by all scientific men on this side of the Atlantic. We recommend them to the careful attention of those of our readers who are of an experimental turn of mind, as being well worth repeating.—Ed.]

EMPLOYMENT OF GLYCERINE IN PHOTOGRAPHY.

Sir,—As you were so good as to insert a few remarks of mine, on some of the uses of glycerine, in No. 42 of the "Photographic News," may I ask for a small space in your columns for a few more observations on the same subject? as I hope and believe the experiments I have lately made may be of use to others working in the same direction.

I find if a developed collodionised plate be allowed to dry, and is subsequently moistened, and heated with the glycerine solution, the operation of "strengthening" is equally easily performed—the film remaining uninjured by the redeveloping and the necessary washings.

In the various dry processes I am sanguine that the use of glycerine, first moistening the plate and then pouring on the glycerine before the development is begun, may be the means of saving many valuable negatives, as it has the singular property of penetrating the film, rendering it tough, and preventing it "splitting off."

I observe, in one of your contemporaries, objection is made to its use, on its score of fogging the plate. This, during many months' trial, has never occurred to myself; and I have this morning intensified a portrait, taken a fortnight ago, with complete satisfaction—the plate having been coated with glycerine all the time. I should, however, suggest, as a possible cause of such a *contretemps*, the omitting to displace the iodide with cyanide or hypo. before the use of the glycerine.

I prefer a weak solution of cyanide for fixing; and, need scarcely add, I very thoroughly wash. R. M. S.

FRESH OR STALE EGGS FOR PREPARING ALBUMENISED PAPER.

Sir,—Being in the country a short time back, I thought I would avail myself of the opportunity of procuring fresh eggs to albumenise some paper. I had succeeded tolerably well with those we obtain in London, but I expected to be doubly successful with what the country affords.

I was, however, a good deal surprised and annoyed to find that my paper—though glossy enough—became perfectly *red* on the morning after sensitising, though operated upon and afterwards kept in the dark room. In the course of a day or two it became perfectly black, though light had been carefully excluded.

I used pure albumen—the eggs new-laid—and five per cent. of ordinary salt.

As I have frequently kept paper of my own albumenising a week and more without discoloration, I shall be obliged by your assisting me to account for my failure in this instance. I may add, that the paper was perfectly dry, and all foreign particles excluded from the albumen—the bath being 80 grains neutral. H. T. T.

[We should like to see this question fully discussed, as we know several very experienced photographers who state, that the result of their experience tends to show, that albumen, used for preparing positive paper, improves if it is kept for some time; and some have even gone so far as to say, that they prefer it in an incipient state of decomposition.—Ed.]

MATERIAL FOR LARGE WASHING TRAYS.

Sir,—I am about to put up a large cistern, and want a lot of large trays to wash prints in, so as to get a running stream of water from the cistern. I thought of making them of wood, and lining them with either lead or zinc. Would there be any objection to the use of either, or which would be best, or what would you recommend? They will be some two or three feet long, and as I want a continuation of them, with taps, &c., in, I do not know what else to use.

A Bathonian.

[Neither lead nor zinc will answer the purpose very well, as these metals will decompose hyposulphite of silver in the fixing bath with precipitation of silver as a black mud. For the *last* washing dishes, when the liquid may be considered as nearly free from hypo., these metals might not be injurious, but we do not recommend them. Either gutta percha, slate, or even wood alone, would be preferable.—Ed.]

DECOLORISING COLLODION WITH METALLIC MERCURY.

Sir,—I had by me a quantity of old collodion, all sorts mixed, positive and negative, &c. It was as brown as the darkest sherry. I shook it up with two or three drachms of mercury; it is now quite clear, very sensitive in the wet process, and the half shades good. This may be a useful hint for others, as I do not remember having seen it mentioned.

M. M. D.

[We are glad our correspondent finds the above plan answer. He will see that we fully described it by referring to our present volume, p. 12.—Ed.]

EFFECT OF GUTTA PERCHA BATHS ON THE SILVER SOLUTION.

Sir,—In compliance with your requests relative to the inferiority of gutta percha baths, I beg leave to state, that I have one in use now that I purchased on July 9th, 1856, and it has been in constant use ever since. I have never possessed any other kind than gutta percha; and am confident, that I can produce a picture, either positive or negative, a view or a portrait, as free from fogging, and as clear and vigorous, from a gutta percha bath as from any other kind. I inclose a specimen taken with the bath in question, which has been in use now within a few days of three years.

William Boyer.

ANSWERS TO MINOR QUERIES.

Citrate of Silver Printing Process.—*F. Collins.* Mr. Hardwich was, we believe, the first who suggested using citrate of silver in printing positives. The advantages are, that the prints are more easily obtained of the peculiar warmth and softness which are so much admired; and to those who prefer the slightly reddish tint which the stereograms, printed by some well-known photographers, possess, we cannot recommend a better process. Several formulæ for a good printing process by this method have from time to time been given in our pages, but if a photographer is already in possession of a good formula for positive printing, he need only modify it to the extent of replacing one half of the chloride of ammonium or sodium which he at present uses in his salting bath by the same quantity of pure citrate of soda. All the other formulæ and manipulations can be employed as in the ordinary process.

Printing Positives on Canvas.—*H. S. H.* The following method of preparing canvas for receiving photographic impressions has been used for some time with decided success. The process is to mix whiting with alcohol, until a pretty thick mixture is formed; paint this over the canvas with a soft flat brush. When dry, rub off with cotton until all the whiting is removed (which is easily done), and the canvas receives the salt and silver solutions beautifully.

TO CORRESPONDENTS.

The Stereoscopic Exchange Club.—We have received several letters connected with the subject to which we alluded in our last number. One gentleman writes, "I am very glad to see you have made some remarks on 'Fairplay's' letter of complaint. I suppose he was agreeable to the terms laid down in the 'News,' and therefore has no right to grumble. It certainly is all a lottery. I have received a few very moderate things; a great many very excellent ones; and nothing but good-will and civility from *all* the members with whom I have had any communication; and my thanks are due to you, sir, for getting up such an association. I, for one, shall be glad to keep the club afloat; and if 'Fairplay,' whoever he may be, is dissatisfied, let him give his name and withdraw at once." Another correspondent writes, "I am inclined to write a line or two to you in order that (as I think you will admit) you may see that 'Fairplay's' complaints as to the 'Stereoscopic Exchange Club,' are not without foundation I inclose one of some prints I received, and I must plead guilty of not returning so good a one for the same as I might have done; but still I send you also a print of what I returned, which I think was a fair repayment. In writing this, I do not do so in order to find fault, but that, on the other hand, I may thank you for having carried out the club, as I have received many interesting and good views." Our correspondent proceeds to suggest that, in case of any member receiving a print which he may think very bad, and unfit for purposes of exchange, he should send the same, with his own name and that of the sender, in confidence to us, so that, if we are of opinion that the print is not up to par, we can drop a hint to that effect to the sender. Of course any person is at liberty to make what complaints he pleases. Far be it from us to wish to curtail the greatest privilege an Englishman has—that of grumbling; but we would much rather interfere as little as possible in a matter which ought to be left to the good feeling and courtesy of the gentlemen themselves. We will not deny that the prints complained of are very bad indeed; but, at the same time, we cannot think that the sender was aware of their great inferiority. He is doubtless a young beginner; and, therefore, it would be kinder to send him good pictures, so that he might see his own failings, than, by returning *quid pro quo*, to confirm him in his erroneous impression, that his own productions are equal to the average.

J. S. O.—We think the address, as printed, is the correct one. You have erred, however, in styling the gentleman "Photographer;" and as there may not be a professional photographer of that name in the town, your letter miscarried. We admire the print very much, and shall be pleased to know the particulars you refer to.

G. S.—Your picture, No. 1, has not been exposed long enough. The mark across the plate, near the hands, is caused by your not dipping the plate in the bath soon enough. Of course, where rain water is mentioned, distilled water will answer the purpose—the former only being recommended as an easily procurable substitute for the latter.

R. O. F. S.—If the prints are "rolled" in a rolling press they will not have that tendency to curl up, and the surface will also be greatly improved.

N. N.—The collodio-albumen or Fothergill process will, we think, answer your purpose best, although in neither of these is the surface of the film retained in a moist state.

S. E. S.—Alcohol is not at all necessary in a developing solution, except there be a difficulty in causing it to flow over the plate; in this case it may be added in small quantities at a time, until this difficulty be overcome. The quantity is unimportant, and must depend upon circumstances.

F. Young.—1. You can easily calculate the amount of silver in a given weight of chloride of silver. The equivalent of silver is 108, and that of chlorine 35·5; consequently, as chloride of silver is composed of one equivalent of each of its constituents, the equivalent of chloride of silver is 108 + 35·5 = 143·5; and, therefore, 143·5 parts of chloride of silver contain 108 parts of silver, the remainder being chlorine. 2. The objection to a portrait combination for landscape photography is, that the centre of the field is liable to be over-done before the side parts. This, however, can be in a great measure remedied by the employment of a small stop in front of the first lens; and, under these circumstances, a portrait combination would do nearly as well as a view lens for landscape photography.

Stereoscopic.—Lenses are made for stereoscopic purposes of as short a focus as 3¼ inches; perhaps one of this focus would suit your purpose.

B. A. (Cam.)—1. A lens of 4½ inch focus can be used, which is ample for covering a stereoscopic plate. 2. Yes. 3 and 4. It is a very good portable form of camera; but of course great durability and strength must be sacrificed to portability. 5. Hardwich.

Geo. R.—Such an apparatus has been described in one of our back numbers. We shall, however, be glad to see your idea.

F. L. G.—Increase the strength of the fixing solution.

Salop.—The fault must be in something you have omitted to describe. From what you say, everything has been prepared, and should therefore work in the most perfect manner.

A. Ross P.—Paint the inside of your glass room a light blue colour.

John T.—We continue to hear very good accounts of the Company's dry plates, but have not lately tried any. We can give no idea of the probable time required for exposure in the case of the dimly-lighted screen. It might vary from 10 minutes to some hours.

C. Kemp.—We think the bath is too weak; try the effect of adding a quarter of an ounce of nitrate of silver to it. That may remedy it; and in any case will improve it. If, however, it does not entirely remove the effect complained of, change the collodion for some other sample.

J. C.—Wash them well in boiling water, and then rub with a hot cloth until the greater part of the wax is removed from the funnels and dishes, and finish with soap and hot water. If any particles of wax resist this treatment, soften them with a drop of turpentine or benzol.

H. H. C.—There is no particular formula required for obtaining negatives. Use good collodion, prepared for this purpose, and a negative developing solution prepared with pyrogallic acid. The bath may be the same as for positives.

J. W. Welch.—The occurrence of pin holes in the dark parts of dry collodion negatives is a very common annoyance. Several things may give rise to them, such as using an over-iodised collodion, or one which has not thoroughly settled. A potassium collodion is especially liable to this occurrence. If the bath is at all turbid, or if dust has settled on the plates, pin holes may occur, and they not unfrequently come when every imaginable precaution has been taken to guard against them; consequently, we suppose we must admit, that nothing much is known about the circumstances upon which depends their presence or absence.

Communications declined, with thanks.—An Old Mechanic,—Nemo.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—W. C. C.—In a Hobble.—F. R. O. Y.

In Type:—S. E. C.—F. Hardwich.—F. L.—J. Jopling.—J. F.—Artizan Amateur.—Viator.—G. H. W.—Peter Positive.—H. and J. Walter.—T Warwick.—B. C. H.—M. A. Root.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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THE ACTION OF THE SOLAR SPECTRUM UPON CERTAIN COMPOUNDS OF SILVER.

BY SIR J. F. W. HERSCHEL, BART.

In the article headed "Miscellaneous" of the "Photographic News" of the 15th instant, I find it stated that "the particular class of chemical forces that are operative in the production of the ordinary photographs resides almost entirely in the portion of the light which vibrates most rapidly, and extends when dispersed in the rainbow form from the indigo and through the violet into a long space, wherein the eye detects no light at all;" and, farther on, that "to the photographist, all the most luminous, the most cheerful, and the most varied hues in nature, are as the outer darkness."

If this statement, which is extracted from the *National Review*, and which I am aware is only a somewhat exaggerated one of the ideas generally prevalent on the subject, were to be accepted as a just representation of the conditions under which this noble art produces its miracles, it would certainly be a great discouragement to those who hope one day to see colour depict itself, and who, at all events, look to see the tones of a finely-coloured picture as well rendered by photography as by the engraver's art. Entertaining, myself, up to a recent period, a notion that this evil was a necessary concomitant of the use of iodine as a photographic agent, connected with the exceedingly curious and peculiar difference of its action under certain circumstances, on the rays on either side of the indigo of the spectrum, I was led to propose (vide *Journal of the Photographic Society*, No. 6, p. 70, June 21, 1853) the abandonment, or at all events, restricted use of iodine in photography; and the substitution of bromine "*coûte qui coûte.*" Of late I have seen reason to alter my opinion on this point. *Voici pourquoi.*

The experiments on which that opinion was grounded, are described in my paper in *Phil. Trans.*, 1840, Art. 79, 129; and 1842, Art. 214, 215. In the first of these, the iodized paper was exposed *dry* to the action of the spectrum. In the others, the reversal of the action from the indigo upwards by excess of iodine was the subject under consideration, where the peculiar positive action comes on at that point with a suddenness and energy naturally leading to a persuasion that the less refrangible rays have, generally, a far inferior action on the iodic compounds to those of the more refrangible.

In studying the habits of the arseniates and arsenites of silver under the action of the spectrum, and of mixed light, with a view to satisfy myself as to the reality of the presence in certain arsenical solutions of a highly photographic metal to which I had applied the provisional name of junonium, I was led to remark that (operating by washes of these salts, and of nitrate of silver on paper, letting one dry before applying the other) *it made all the difference in the world which solution was laid on over the other.* The nitrate being laid on first, then dried, and the arsenical solutions afterwards washed over it, the action was extremely feeble and slow; quite otherwise when the order was reversed, and especially when the nitrate was applied to the paper actually under exposure to the light. In that case it was rapid and energetic (though very far inferior in both respects to the junoniferous solutions). This led me to a repetition of my former experiments with iodine and bromine, attending to the order of the washes, and observing always to apply the nitrate while under exposure. To my very great surprise, I found that under these circumstances, so far from the action of the spectrum on the iodine being either limited to the more refrangible rays, or very feeble in the yellow, orange, and red, it was carried down with nearly full intensity, not only to the very farthest extremity of the red (where the negative action on the bromine ceases), but very considerably beyond it. The following are the readings off of measures of the extent of the spectra impressed on the paper (after fixing and drying), on three several occasions (April 1, April 6, May 9, 1859), as read off on a scale of equal parts, the zero corresponding to the centre of the sun's image in the extreme fiducial red of a cobalt glass; —10·05 to the same centre in the fiducial yellow; 15·0 to the brightest green; 25·0 to the best blue; and 38·0 to the place of the second set of dark lines marked H in Fraunhofer's spectrum:—

	Ioduretted Paper.	Bromuretted Paper.
Least refracted extreme....	— 3·7	0·0
2nd experiment	— 4·0	— 0·5
3rd experiment	— 3·5	0·0
Mean..............	— 3·73	— 0·17
Most refracted extreme ...	+ 59·0	+ 64·5
	+ 58·5	+ 65·0
	+ 58·0	+ 65·0
	+ 58·50	+ 64·80

In all these readings due allowance is made for the sun's semi-diameter, so as to make them central. Thus we see that the action on the bromuretted paper is almost rigorously limited to the extreme visible red (where it is strong, and terminates very abruptly), while that on the iodized paper extends 3·73 parts of the scale, or about one-seventeenth of the whole length of the photographic spectrum, below it, or into the invisible heat rays. Its termination is less abrupt than in the other case, but the action is strong and decided to within a very few tenths of a part of the extremity. There is an evident though not a very strongly marked maximum of darkening at 34·5, or somewhat short of the best indigo. The bromuretted spectrum offers no such maximum, but is continued 6·3 parts beyond the cessation of the ioduretted into the invisible actinic rays. The action on nitrate of silver, *per se*, terminates at + 11·0.

These facts, I think, will rescue the iodide of silver, when properly used, from the imputation of insensibility to the more luminous rays. It is for photographists to make the application in the manipulations of their art. In point of rapidity of action, there is no comparison between the dry and wet material.

Collingwood, July 16, 1859.

P.S. (July 17).—Under the action of such a sunshine as I never remember to have witnessed in England, and which has continued cloudless and perfect since sunrise, it occurred to me that before dispatching the above, I might procure some perfect and striking specimens of impressed spectra to send you in illustration of the facts insisted on in the above. To my great astonishment, I have *not been able to procure an iodized spectrum having the characters described;* but instead, nothing but spectra of the sort indicated in the paper first cited, viz., degrading in intensity from the blue to the red end, and almost evanescent in the least refrangible rays. What is still more surprising, the *iodine* impressions of to-day have been singularly feeble in intensity. This recalls a complaint I have somewhere read of the want of success in photographic operations under tropical sunshine.

I cannot, however, reject the evidence of the experiments I have related, whose results I have before my eyes (and which I send for your inspection, particularly requesting their return, as they are cut out of a register I keep of such spectra). To say nothing of the exact agreement of their measurements, there is one feature which admits of no explanations, on the supposition of mistake or accidental impurity. The iodine spectra extend farther into the *less* refrangible region than the bromine. *Now, hitherto no substance known has given any such result*, and the bromine spectra obtained to-day fall *somewhat* short of it. Junonium (if it be really a distinct body) *equals* bromine in this respect (as you will see by comparing the specimens sent); but this, so far as I am aware, is the only instance of so extensive an action.

Turning over my collection, I find three more iodine spectra, obtained on the 19th of March, all which agree in the prolongation of a powerful action far beyond the red viz., to — 3·0. On that day no corresponding spectrum with bromine was obtained.

The materials I have used to-day were identically the same as in the former experiments; but, anxious to account for the discordance of results, I have also used fresh iodine and nitrate, and varied the papers, but unavailingly. At present I will hazard no comment on this apparent contradiction.

METHODS OF INTENSIFYING NEGATIVES.

BY T. F. HARDWICH, ESQ.

In number 43 of the "Photographic News," the difficulty of obtaining *palladium* is spoken of as an objection to the use of that substance in photography, as lately proposed by Professor Draper, of New York. It appears that the price at the present time is nearly double that of gold, and the supply of the metal limited. I think, therefore, that I might save some of your readers the expense of purchasing the chloride of palladium, if I give them beforehand an idea of the amount of extra intensity which they will gain by its employment.

A ready mode of intensifying a weak negative is often required in copying manuscripts or printed matter of the same size as the original. It matters not whether a simply iodised collodion, or a bromo-iodised be employed for this purpose; in either case the first deposit of silver will often be of a metallic aspect, and in consequence the ordinary mixture of pyrogallic acid and nitrate of silver will fail in getting up the intensity. A solution of chloride of gold applied to this image, darkens it superficially to a considerable extent, and changes the colour by transmitted light to a deep violet blue. The chloride of palladium produces a shade of colour more nearly approaching to black, but in my hands neither gold nor palladium has proved to be sufficient to produce absolute opacity. Either of the following methods will, however, secure the desired result.

First. Dissolve thirty grains of bichloride of mercury in an ounce of warm water, and when the solution has become cold, apply it to the plate previously fixed and washed, until the silver is *entirely* converted into a white powder; this will take some time; now wash with water, and pour over the whitened image a very weak solution of hyposulphite of soda, containing, perhaps, six or eight grains to the ounce of water. The white powder is gradually blackened, and when the action has penetrated to the back it is complete.

You will easily explain to your readers, Mr. Editor, the *rationale* of this process, which no doubt is quite familiar to you. I merely mention it as one which will produce an impenetrable brown deposit, even under unfavourable conditions. It is possible, however, that some may not succeed, and if so I would direct their attention to the following fact, viz., *that it is quite necessary to start with a given quantity of real silver in the image*, otherwise the corrosive sublimate will not produce the requisite opacity. Supposing, for instance, you have an old manuscript to be copied without reduction, and you are working with a bromo-iodised collodion. On applying the sulphate of iron, an extremely delicate image comes out, but the letters are sharp and well defined. Now, wash off the sulphate and put on the pyrogallic acid and nitrate of silver; it appears to produce very little effect, but in reality an additional deposit of silver falls. Do this a second time, and, provided you can keep the letters clean, even a third. Lastly, fix with cyanide and examine by transmitted light. What, then, do you see? A translucent and grey image! Nevertheless the quantity of real silver in this image is considerable, and the intensity is wanting simply because the molecular state of the particles is unfavourable for obstructing light. Under the decomposing action of the bichloride, followed by hyposulphite, it will reach absolute opacity, whereas if the employment of the pyrogallic acid after the sulphate of iron had been omitted, the result might have been a failure from lack of silver to work upon. We learn, therefore, that it is difficult to judge of the quantity of metal in an image by simply holding it against the light.

Another process, which always appears to me ingenious and beautiful, is that of Barreswill and Davanne, originally published in the *Chimie Photographique*, but which I have not seen as yet in your journal It does not appear to matter in this case whether the image is weak or strong. A solution of iodine is applied to the surface after fixing, and the plate is then washed and exposed to the light. On taking it back again into the dark room and treating with mixed pyrogallic acid and nitrate of silver, any amount of intensity can be obtained. Those who are fond of witnessing a pretty experiment may proceed shortly as follows:—Take any weak instantaneous positive, and in open daylight pour over it a solution of five grains each of iodine and iodide of potassium, in five ounces of water, until it becomes quite yellow from conversion into iodide of silver. Now wash and apply a few drachms of a ten or twenty grain silver solution and wash again. The blackening will then be very rapid under the influence of pyrogallic acid and nitrate of silver. This mode of proceeding may not, perhaps, be as certain as that originally devised, but it is quickly carried out, and will serve to show how much the process can accomplish.

I may observe, in conclusion, that I have very little faith in these modes of intensifying when the negative has a full gradation of tones, but for black and white objects they are very useful. These remarks do not, of course, refer to Dr. Draper's method, which is serviceable when we wish to give, as it were, simply a finishing touch.

King's College, July 13th, 1859.

THE INFLUENCE OF LIGHT ON THE POLARISED ELECTRODE.

BY W. R. GROVE, ESQ., Q.C., V.P.R.S., &C.*

(*Abstract.*)

Soon after the experiments of Daguerre were published, it occurred to me that the galvanometer might be used as a test for the chemical effects of light; and I succeeded in obtaining a deflection of the needle, by allowing a beam of light suddenly to impinge on a daguerreotype plate in a trough of water—the plate being connected with one extremity of a galvanometer, and a gridiron of silver-wire placed in front of the plate with the other. This experiment I showed at a lecture at the London Institution, in 1843; and it was subsequently used as an illustration of the convertibility of force, in my essay on the "Correlation of Physical Forces."

I tried some further experiments at the time without obtaining results of any importance; but, as galvanometers at this period had not reached the degree of delicacy they have since attained in the hands of M. Ruhmkorff, I determined, this summer, to resume the inquiry; and the results I have obtained I now proceed to describe. The galvanometer used in the following experiments is by Ruhmkorff, formed of 544 feet of fine copper wire, and though not so delicate as the very long wire instruments used by M. Du Bois Reymond and others, it has proved sufficiently delicate for most of the effects I aimed at.

The idea with which I started was to arrange two plates of platinum in an electrolyte in such a manner that a bright beam of light should impinge on one while the other was in darkness, and yet to allow free electrolytic communication. After making a somewhat complex apparatus, which did not answer the purpose, the following simple means of effecting my object was adopted:—In a cell similar to those used for the nitric acid battery, the outer cell being of thin glass and the inner one of porous ware, two platinum plates were placed, each of six inches by two—four inches by two, or the immersed portions of the plates, being platinised or coated with a deposit of black platinum. Both the outer and inner cells were filled with distilled water. slightly acidulated with sulphuric acid; and some tow, steeped in the same solution, was stuffed into the upper part of the porous cell around the platinum, so that this latter plate was perfectly excluded from light. The extremities of the two plates were metallically connected. A brass cylinder, covered at the top, was placed over the whole, its lower circumference resting on a circular pad of paper, so as to exclude light.

The apparatus, thus disposed, was set aside for ten days, so as to allow the local currents to subside. At the expiration of this period the apparatus was taken into bright sunlight, the position of the plates so arranged that the one in the outer or glass cell should be opposite the sun, the terminals connected with the galvanometer, and the temporary deflection occasioned by polarisation allowed to subside, or rather to reach a fixed point, for there was always a slight deflection.

The brass cylinder, which excluded light from the apparatus, was now removed; and the galvanometer needle instantly deviated to 10°, the platinum exposed to sunlight being positive to that in the dark, or as zinc to copper. The platinum plates were now reversed, that which had been in the outer cell placed in the porous cell, and *vice versâ*, and the apparatus again set aside for ten days; at the end of this period it was again taken out, the experiment repeated, and the same result obtained; *i.e.*, on removing the brass cylinder there was a deflection of 12°, the platinum exposed to light being positive to the sheltered one.

The identity of electrical effect, taking place with the reversed plate, seemed so strongly in favour of the impact of the solar rays having an initiatory effect in producing a voltaic current, that the only remaining point seemed to be to ascertain whether it was due to light or heat, to the chemical or calorific rays of the sun; yet the conclusion I then came to was erroneous, as will presently be seen.

In order to ascertain how far the effect was due to heat, I arranged, in a room lighted by a small candle, the same apparatus over a fire of asbestos, heated by coal gas, so that both radiant heat and an ascending current of hot air impinged on the side of the glass in which was the exposed platinum, while the opposite side was entirely sheltered from the heat by a metallic shelf on which the cell rested; this experiment was continued until one side of the cell was uncomfortably hot to the hand, while the other side was quite cool; but not the slightest deviation of the galvanometer took place.

I now repeated the former experiment with sunlight, changing the liquid each time.

In three successive experiments the deflections on the impact of light were in the same direction, the exposed platinum being positive; but, in a fourth, the deflection was in the reverse direction, the exposed platinum being negative; in several subsequent experiments there was always a notable deflection which ensued on the impact of light, but it was sometimes in one direction and sometimes in the other. I ultimately discovered that, in the deflection produced by light, the needle of the galvanometer deviated in the same direction which it took upon the first contact of the wires connected with the platinum plates. The effect of light was, therefore, to increase the deflection occasioned by the polarisation of the platinum plates; and this, my subsequent experiments have, I think, fully established.

Although the experiment on the impact of heat seemed to show that the heating effect of the solar rays was not the cause of the phenomena, yet it might well be that the solar rays absorbed by the platinum black would produce a greater heating effect at the actual point of contact of the platinum and liquid than any non-luminous heat would produce; and I was, therefore, anxious to ascertain whether the different coloured rays of light showed any difference in their effects. To this end I procured three plates of coloured glass, one blue, the second yellow, and the third red; a strip of thick brown paper was pasted to the opposite sides of each of these plates of glass, so as to form a nearly cylindrical chamber cut by the plane of the glass. A cover was placed over each of them; and the chambers so formed could be placed over the cell containing the platinum plates, the coloured glass plates intervening between the sun and the platinum in the outer cell. A great number of experiments were made with these apparatus; and in all the deviations of the galvanometer were notably greater with the blue glass than with the yellow or red, and, of the latter two, the yellow gave slightly greater deflections than the red glass.

This result is, I think, conclusive in favour of the effect being due to the chemical, not to the calorific rays of the sun, the more so when we consider that the yellow glass allowed a far larger quantity of light to pass than the blue glass. I may also add that I have obtained a slight galvanometric deflection when diffused daylight was allowed to impinge on the platinum plate, and where there was no perceptible difference of temperature between the illuminated and the non-illuminated plates.

The superiority of the yellow over the red was not so strongly marked; and, considering that the yellow glass allowed much more light to pass than the red, I am not disposed to think that there was any actual superiority in the former; the effects observed with these two colours are, however, corroborative of the effects not being due to the red or heating rays of the sun.

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* Communicated by the author to the *Philosophical Magazine*, having been read at the last Meeting of the British Association.

In a small number of experiments the following effect took place :—

After a certain time of connection with the galvanometer, the cover being over the apparatus, the signs of polarisation changed, *i.e.*, supposing the needle of the galvanometer to deviate to the left, and indicate that the exposed platinum was positive, the needle would gradually return, pass the zero point, and be deviated to the right; when this was not the case on removing the cover, the effect occasioned by the impact of light was a return of the needle towards the zero point, indicating an influence in the direction of the original polarisation. On setting aside the apparatus for twenty-four hours, with the plates in metallic connection, and then repeating the experiment, the deviation of the galvanometer was in the direction of the final polarisation. This apparent anomaly may have arisen from a conflict of two classes of currents—the one arising from imperfect mixing or want of homogeneity in the liquid, and the other from the state of surface of the platinum; the latter would most probably be the current affected by light.

As the general effect of light was to increase the deflections occasioned by polarisation, whatever direction these assumed, it seemed probable that the exclusion of one of the plates from the light, which I had commenced with in the hope of obtaining a current initiated by light, was unnecessary, and that the observed effects would be rather increased by exposing both plates to light. I therefore arranged two platinised plates in a cell without a porous diaphragm, inclined to each other like the letter V, but without contact, and allowed the light to impinge on the interior surfaces, or those exposed to each other; but, to my surprise, the effect was very trifling, the needle deviating only one or two degrees, and that in a sluggish and irregular manner.

When, however, the two plates were arranged parallel, the one shading the other from the light, as good deflections were produced as with the porous cell—the more so if the black or shaded plate were of polished, and the front plate of platinised platinum.

Why light should produce a greater augmentation of the current, when impinging upon one than on the two plates, I cannot well understand, and therefore will not attempt any hypothetic explanation, but leave it for further experiment.

In all the experiments I have made on the subject of this paper, the most marked effect upon the galvanometer is produced when the polarisation causes a small permanent deflection of from 5° to 10°; when the polarisation of the plates is extremely slight, the effect of light is very feeble; and when the polarisation is considerable, so as to deflect the galvanometer to 20° or 30°, the increased force required to produce a small increase of deflection is too great to afford notable results.

I have used the term polarisation, having no better word to indicate the feeble currents which are always observed when two platinum plates, immersed in a liquid, are connected with a delicate galvanometer. The electrical currents which would ensue if the plates were polarised by connecting them with a voltaic battery, and then detaching them, would be far too powerful for the delicate indications which I have been examining. There can be no doubt, at least to those who adopt the chemical theory of the voltaic pile, that both these classes of polarisation are due, when one homogeneous liquid is employed, to slight deposits on the plates, either of films of gas, or of some substance which acts chemically on the liquids, and the effect of light would seem simply so, or an augmentation of the chemical action taking place at the surface of the electrodes, which is the *locus* where the chemical changes, producing or produced by voltaic currents, are always observable.

With more sensitive galvanometers, and with a greater variety of solutions, this class of experiments may, I venture to hope, be found important in further investigating the effects of light on chemical actions; and the pure coloured rays of the spectrum may be employed.

There can, I think, from analogy, be little doubt that light would influence those actions of surface which are comprehended among the various effects to which the term catalysis is applied. In an experiment I made in the month of September, 1851, two similar glass tubes, containing each 15 grains of water, were placed, the one under an opaque porcelain, and the other under a glass vessel of the same size, with capsules of sulphuric acid by their sides; I found that evaporation took place much more rapidly in the one exposed to light, though it was in a room with a northern aspect, on which the sun never shone. In twelve days the water under the glass vessel had lost 6·3 grains, that under the porcelain 5·4, showing a difference of nearly a sixth part in the evaporation in favour of the tube exposed to light. I mention this experiment here as showing a probability that the liberation of vapour or gas may be accelerated by light, as M. Donny's remarkable experiment seems to show that evaporation is a surface action, and the effect of light on polarised plates may be somewhat of the same nature.

AUSTRALIAN NATURE AND THE ART OF THE PHOTOGRAPHER.

Few persons are now of sufficient age, to recollect the sensation which the natural productions of New Holland produced in Europe, when first brought hither. A quadruped furnished with the bill of a duck,* a hedgehog of a similar extraordinary appearance,† a tree which bore wooden pears, and similar anomalous productions, astonished the general public, while even the learned shared that surprise. It was the celebrated Professor Blumenbach, of Göttingen, who thought that the continent of New Holland was a piece of the moon or other star, which had fallen with its strange productions on the surface of our globe. Successively, when other parts of the world became more thoroughly examined, there were found intermediate and transition types, and placed New Holland and its nature into due equilibrium with the other creation.

Still, Australian nature is one replete with wonder and beauty, and the civilised world will become astonished and pleased, whenever heliography will have brought to our notice the various products of that strange land. To begin with the highest types of nature: the aspect of the starry heavens is so different from that of our northern hemisphere, and the *southern cross* and the Magellanic clouds are sights of surprising interest. As photography has already succeeded in fixing and retaining the heaving waves of the ocean, the world of *clouds* in Australia (a knowledge first hinted at by Howard) will be the more interesting, as it is in that part of the world alone, that those *nuggets* of ice, some 6 and 7 inches long, descend from heaven, and indicate a strange and different composition and arrangement of the atmospheric elements. All these subjects our noble art ought to seize, as they will not only interest Europe, but be a source of profit to the artist thus engaged. In all these endeavours we recommend boldness and a *large* scale of plates, because it is only such which will find their way into works and periodicals of a high order.

It was when examining, several years ago, the fine paintings of American nature, by Mr. Catlin, that the idea struck us that there may be, in those distant wilds, geological phenomena, if not geological *formations*, not observed hitherto in other parts and unknown to science. Now, amongst the numerous aids which science in general will receive from photography, that afforded to geology will be one of the most important; because no amount of industry or talent will ever enable the draughtsman to delineate the face of these gaps and crevices and *éboulements*, which are the very anatomical preparations of that huge organism called the globe. Not to mention some most curious forms and appearances in the interior of the Australian Alps, seen but by few Europeans; yet, the Shoal-haven Gully, south of Sydney, said to be 2,000 feet deep (?), is an object of the greatest curiosity; more worthy of attention than those numberless sights of the Swiss Alps, reproduced now *usque ad nauseam*. And we have yet to observe, that the more varied be the usages to which photography may be applied, this will not only benefit those departments of art and science, but impart to heliography new methods and new proceedings. And thus we are convinced that the seizing of large extents of the cloudy atmosphere, as well as that of large geological *tableaux*, will require and bring forth new proceedings of tinting and colouring.—Several parts of Australia are surrounded by iron-bound shores and rocks, some of which are even of historical interest; for instance, the rocks called Tasman and his Wife, in Tasman's Peninsula (Van Diemen's Land), where the Dutch navigator first landed, in 1646, a discovery considered even then so important, that the paved floor of the court house in Dortrecht was made to represent the track of this enterprising man.

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* Ornithorynchus paradoxus.

† Echidna histrix

If, as we said before, everything in New Holland exhibits such a strange and original character, we may, commencing with the general features of the country, first mention its flower-meadows, which also are distinct from anything of the kind in Europe, and can only be compared somewhat with the large *Ericeta* (heaths) of the Cape of Good Hope. In Australia, there are miles of partly sandy and partly swampy ground, covered by myriads of those little shrubs and plants, which, in England, constitute the pride of our conservatories. Such are Epacris, Delvynia, Gompholobium, and the like, which being all very ornamental and fine flowering, impart to these localities a very great charm. The hand and eye of the draughtsman would weary to trace these numberless forms, and it is only heliography which can lay down infinite objects in an infinitely short space of time. To make such a view still more interesting to the descriptive geographer, we have to state, that those Australian flower-meadows must not be imagined as being destitute of larger shrubs and trees. On the contrary, here and there one of the fantastic palm-like Xantorrheas, or Casuarinas, somewhat resembling a weeping willow, or even a large gum tree (Eucalyptus), diversify the aspect, and add to the originality of the sight. We may here state our general belief, that as soon as *geography* will really deserve the name of an earth-depictor, such scenes and sights will largely appear in its pages, to displace those descriptions of dynastic palaces and other transitory political phenomena, now occupying so much of its space.

Our allusions to Australian scenery would not be considered complete, if we were not to mention those *natural parks*, if we may so call them, which struck even the first tourists to the antipodes. Their appearance denotes good pasture land, and the soil is a compound of sand and humus. As in our parks, stately trees are scattered over the ground, mostly gum (Eucalyptus), a tree which often does not branch off but at a height of 50 to 60 feet, and the bark of which is often of a white, glossy colour. With the exception of a very little under-wood, the soil is covered with tender grass, and these are the places where the millions of merino sheep, introduced so fortuitously into these colonies, graze the whole year round—wandering gold-mines, as it were, which now yield a million sterling every year. The sight of these park-like localities, illumined by either the rising or setting sun, under a sky ever clear and brilliant, will yield unsurpassed scenery to the camera of an able artist. If we proceed north (towards the line), Australian nature assumes a more tropical aspect, and near Moreton Bay forests are to be met with so dense, that they are spread over with darkness, even in the day time.

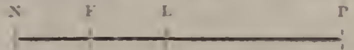
The members of the *Alpine Club*, and the friends of similar enterprise, will learn with pleasure, that Australia also presents opportunities for the healthful and invigorating alp-climbing—although at a rather long distance. Under that latitude, however, these mountains do not attain the limit of perennial ice (*glaciers*), and only their summit being at particular seasons covered with a transient layer of snow. But there are gullies and secluded valleys there, where the snow has destroyed long tracts of the semi-tropical vegetation. Here the professional photographer or amateur may find a vast field of interesting and lucrative employment; as, we repeat, the engraver, woodcutter, and publishers, all over Europe, are most anxious for novel and well-executed heliographic plates.

(To be concluded in our next.)

DIMENSIONS FOR A COPYING CAMERA.

BY JOHN SANG.

The following table, which shows the dimensions of copying cameras, will at once solve the question of your correspondent, "Capt. S. S. B.," and probably also may be useful to other readers who mean to construct such instruments. It gives the dimensions of the box for making copies equal in size to the negatives, and from that upwards to magnifying them ten times. It can be extended to any other magnifying power, by observing that $(NL)^2 = NF \times NP$, (see figure). N being the negative, P the positive, or focussing screen, L the lens, and F the focus for parallel rays.



In the table the focal length of the lens (that is FL), is conceived to be 1.

$\frac{LP}{LN}$	LP	LN	NP
Enlargement, or number of times the length of the positive contains that of the negative.	Distance between the positive and the lens.	Distance between the negative and the lens.	Length of the box measured between the negative and the positive
1	2	2·0	4·00
2	3	1·5	4·50
3	4	1·333	5·33
4	5	1·25	6·25
5	6	1·2	7·20
6	7	1·166	8·17
7	8	1·142	9·14
7·873	8·873	1·127	10·00
8	9	1·125	10·12
9	10	1·111	11·11
10	11	1·1	12·10

As the numbers are all in terms of the focal length, in order to apply them, it is only necessary to multiply by the focal length of the lens under consideration. For example, "Capt. S. S. B." wants to find the dimensions of a camera for enlarging negatives 2 inches square to 10 × 8 inches; as his negative is square, its side must be enlarged until it covers the greatest dimension of the oblong picture he wishes, that is to say, 2 inches must be magnified into 10, or 5 times. The focal length of his lens is 2½ inches. The numbers in the line of the table opposite an enlargement of 5 times, must be multiplied by 2½ to give the dimensions suitable for that lens.

Thus the length of the box (or rather the distance betwixt the negative and the focussing screen) is 7·2 × 2½ = 18 inches. The distance of the lens from the negative is 1·2 × 2½ = 3 inches. The distance of the lens from the positive is 6 × 2½ = 15 inches. Also, in order that he may have it in his power to enlarge the pictures any degree between equality and 5 times, his box must be so arranged, that by means of a sliding motion or otherwise, the distance between the negative and positive may be reduced to 4 × 2½ = 10 inches, while the lens must be capable of being moved to within a distance from the negative of 2 × 2½ = 5 inches.

Of course, it is imperative that the true principal focal length of the lens be taken, that is to say, the distance between the optical centre of the lens and the image of the sun. It will not do to form an image of the sun on a piece of paper, with a combination of lenses for photographing, to measure the distance of the image from the back lens, and call that the principal focal length of the combination. The distance between the paper and the optical centre must be measured, and as it is difficult to discover that point, I have also inserted a line in the table (enlargement 7·873) by which the focal length of a photographic combination may be found very readily and without calculation.

On looking along to the last column at 7·873, it will be observed that if a lens enlarges at this rate, the distance between the object and its image is 10 times its focal length. It is the same if it diminishes an object at an equal rate. Consequently, the focal length may be found thus:—

Mark off exactly 2 inches on the ground glass of the camera by a pencil line; cut a strip of white paper exactly to the length of 15¾ inches; cause the picture of the strip of paper to fall on the focussing glass. If the picture is longer than the space marked off, move the paper away from the camera; if smaller, bring it nearer until the length of a sharp picture of the piece of paper is exactly 2 inches. Measure the distance between the paper and the ground glass of the camera; the tenth part of that distance is the focal length of the combination. It would be the same thing if the piece of paper had been made 7·873 inches, and the mark on the focussing glass 1 inch, or any other suitable lengths in the proportion of 7·873 to 1.

Kirkaldy, 11*th July*, 1859.

PORTABLE DARK ROOM AND CAMERA FOR THE PAPER PROCESSES.

BY M. F. TILLARD.*

The camera that I have the honour to submit to the Society, is one that I have had in use for some time. My object has been as much as possible to reduce in amount and to simplify the photographer's hitherto very complicated baggage. I believe I have succeeded in obtaining a result which appeared, at first sight, almost too simple, too primitively common, for me to presume to consider a description of it worthy the attention of this learned Society; but I yielded to the solicitations of several of your members, who, having recognised the advantage of my dark room, have adopted its use, and have urged me to make the following communication. I should first observe that my system does away with all dark slides, the smallest number of which is very cumbersome to the operator when requiring to work in the country or on the march, so to speak. Instead of my apparatus, as is ordinarily the case, being immensely heavy, I have simply the weight of twelve sheets of very light cardboard; that is, if I wish to obtain twelve photographs.

Although the modification that I have introduced into the system of the dark room relates only to the arrangement of the dark slides, I should observe that I have adopted for the body of the room itself a light white wood, as lime, instead of walnut, which warps, becomes twisted, and is very heavy. My dark room, then, is formed of very thin planks of lime-wood carefully put together, and uniting to this the insignificant weight of my dozen paper holders, I can, when travelling, dispense with the customary porter, who is often very difficult to procure, and always a most expensive appendant. I therefore recommend to travelling operators the portable camera made of light wood.

In the ordinary dark slides a sheet of negative paper is kept in place by the pressure of one or two glasses. This being necessary, and the front glass being required to serve for a rest, I use for this purpose the ground glass itself.

I fix, then, this glass, with the *ground side outward*, in a frame, letting the edges project beyond, about the thickness of a stout Bristol board, and this remains fixed in the camera instead of being movable, as in the old system. The object to be photographed having been focussed, I do not remove the glass, but only apply against it one of the frames, which I will endeavour to describe, and in which will be recognised, doubtless, the frame invented by M. Clement, and which bears his name. I should say in passing, without wishing at all to deprive M. Clement of the merit of his idea, that more than five years before he published his system of frames, I had exhibited some precisely similar to several members of this Society. I mention this fact from no desire of disputing with M. Clement the question of priority of invention, as these frames are but an accessory in my system.

These slides are made of two sheets of strong cardboard laid one upon another—the one plain, the other cut so as to form upon the first a frame, of which the borders are only about three centimetres (three quarters of an inch) wide, three sides being glued together, thus somewhat resembling the cardboard portfolio of a travelling landscape painter. On the side where the two cards remain, not adhering to one another, I slip a sheet of sensitive paper, and on this in the same groove another sheet of cardboard, several centimetres longer than the paper, thus filling the place of the wooden front of the ordinary frame. The frames being furnished with negative paper, I push one of them towards the ground glass, and there applying it on the side of the card forming the frame, and pressing it with the hand, I uncover the negative sheet by removing the sheet of cardboard which had been first placed over it in the groove of the frame. Then, still holding the frame with the hand, I lay behind it a little board, so as to produce a pressure upon the frame in the same way as it is done in positive pressure frames.

This pressure is caused by using two movable strips of wood turning round a pivot. Their extremities are placed in lateral nicks in the hind parts of the camera. These nicks, cut obliquely, allow the use of more or less pressure in causing the strips of wood to be pushed in more or less deeply. I have said that the ground glass projects over the frame where it is placed. This projection coming against the open part of the cardboard frame by means of the pressure used, occasions an immediate contact between the sensitive sheet and the glass on which the image is portrayed. The exposure terminated, the small board is removed, in order to replace the front cardboard slide, and the negative paper is withdrawn from the luminous rays, and another slide may be substituted. It has probably been remarked that I operate by exposing the sensitive sheet behind the ground glass. I affirm that this intervening does in no way interfere with the faithfulness of the image, and I even prefer ground glass to clear glass, which may be untrue and cause a deviation of the photogenic rays. In case it might be desired to use clear glass, nothing would be more simple than to substitute a frame containing one for that containing the ground glass, after having obtained the focus. This would only be a trifling addition to the weight of the photographic baggage, without rendering it more cumbersome.

EMPLOYMENT OF SALTS OF CADMIUM IN THE COLLODIO-ALBUMEN PROCESS.

BY M. DAVANNE.

The object of these remarks is to rectify a formula which has been given for the preparation of albumenised dry collodion (Taupenot's process), and which prescribes the use of salts of cadmium dissolved in white of egg. An experiment made with this object convinces me, that the author of the formula had published it without having previously proved its correctness. In fact, iodide and bromide of cadmium immediately curdled the albumen so decidedly, that I imagined I must, by mistake, have employed bichlorure of mercury instead of bromide of cadmium, the two substances being somewhat similar. But a further trial convinced me, that the iodide and bromide of cadmium produced the same effect upon the albumen as a large number of metallic salts, such as nitrate of silver, bichlorure of mercury, sulphate of copper, &c. That this effect is very powerful is proved by the fact, that it is visible in liquids very much diluted; as, for instance, a single gramme of white of egg dissolved in eight hundred grammes of water becomes troubled when a few drops of dissolved iodide of cadmium are poured into it. The other salts of cadmium have the same property, though in a less degree than the iodide. Perhaps I ought to attribute to this action of the salts of cadmium upon the albumen a number of long spots, appearing to proceed from a partial coagulation of the albumen, and which became especially visible whenever I used old collodions with the iodide of cadmium, in order to obtain upon the glasses the first layer of iodide of silver, and which I afterwards covered with albumen. Perhaps a small quantity of salts of cadmium remained in the layer of collodion. I have since been more constantly successful in only using collodions prepared with the iodide of ammonium. I therefore think, that in preparing plates by the Taupenot process, it is better not to use collodions prepared with the iodide of cadmium; and I must, at the same time, warn photographers, that they will completely lose their albumen whenever the iodide or bromide of cadmium is introduced into it.

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* Description of an apparatus exhibited by the author at the French Photographic Society

Dictionary of Photography.

Experiment.—A trial, an act, or operation to discover some unknown fact, principle, or effect, or to establish it more conclusively when discovered.

Exposure.—The time during which a sensitive surface should be exposed to the action of the light, is one of those points in photographic manipulation respecting which precept can teach the operator very little. Experience is almost the only guide to be followed, as, owing to the varying intensity of the light, the requisite time will be constantly changing. In determining the time, some account must be taken of the colour of the object to be copied, as all colours are not equally active. Thus, yellow, green, and red, have very little action. The photographic intensity of light decreases very sensibly in proportion as the sun approaches the horizon; and the state of the atmosphere must also be taken into account, as the time of exposure is much retarded if it is the least hazy or of a yellowish appearance. In the event of a first attempt failing, the operator should immediately try a second time, and by a little thought on the appearances presented by the unsuccessful picture, he will be most likely to time the exposure of the second picture correctly. The following are some indications whereby the operator may know whether he has exposed the plate too long or too short a time:—An under-exposed picture is slow in appearing, and by continuing the development for some time, the high lights become very intense without the shadows making their appearance, and the resulting picture is of that class usually denominated "soot and whitewash." An over-exposed picture, on the contrary, makes its appearance very rapidly, the shadows developing almost as soon as the high lights. The plate soon blackens all over the surface, and the result on fixing is a misty, indistinct, and faint picture, of a red or brown colour.

Ferrocyanide of Potassium, or *Yellow Prussiate of Potassa*, is a beautiful salt, forming large transparent yellow crystals. They dissolve with ease in 4 parts of cold and in 2 of boiling water, and are insoluble in alcohol. When exposed to a gentle heat, the salt loses water and becomes white and anhydrous. Ferrocyanide of potassium is of great value as a chemical reagent, as it gives rise to precipitates, which have frequently a very characteristic colour, when mixed with neutral solutions of the heavy metals. It has been employed by Sir John Herschel, Mr. Hunt, and others in various photographic processes, both as an agent sensitive to light in itself, or in combination with iodide of silver, and as a developing agent when salts of iron were used as a sensitive material, as in the cyanotype process.

Film.—The thin coating of collodion, albumen, or other substance with which paper or glass is coated for photographic purposes. The sensitive coating of iodide of silver itself is also frequently called the film.

Filter, a strainer; a piece of paper, cloth, or other substance through which liquids are passed to remove impurities or solid matter suspended in them.—A filter for photographic purposes is best made by employing a glass funnel and inserting a piece of filtering paper cut and folded in the proper manner. The filtering paper used for this purpose should be the best thin white blotting paper. In making a paper filter, take a square piece of the paper of a size proportionate to that of the funnel, and first double it from corner to corner in the form of a triangle; double this again in the middle so as to form a smaller triangle, and round off the angular portion of the margin with a pair of scissors; this, when two adjacent sides are separated, forms a hollow cone, the apex of which is to be placed downwards in the funnel. Another way of forming a paper filter is to double the paper once and then fold it in the same way as a fan, observing so to open it and lay it on the funnel, that the folded edges of the paper touch the inside of the funnel and form a series of grooves, so as to allow of the free percolation of the liquid.

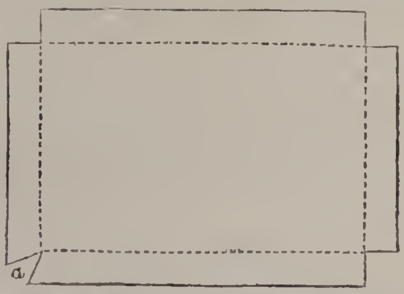
(To be continued.)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

One of the most desirable characteristics which can pertain to any mode of manipulating is, simplicity; we shall, therefore, now describe a method of producing a gutta percha dish far exceeding in ease and simplicity either of those we have already explained. At first sight it would appear that dishes made as we are about to describe would be wanting in strength and durability; we may remark, however, that we have had some in daily use for many years, which are now as good as when they were made. The plan has the special advantage of enabling the tourist to improvise a dish in five minutes in any place where he can procure a piece of sheet gutta percha.

Take a piece of gutta percha of the requisite thickness, say one-sixth of an inch, and cut it to the following shape, the size, of course, being governed by the required dimensions of the dish:—



The square pieces cut out at the corners must be the size of the intended depth of the dish, say from three quarters of an inch to an inch. The cut should not be quite straight through the sheet, but with a slight bevel inwards, so that when the sides are bent up, the meeting edges shall form a mitre. The piece cut out at the corner marked *a*, is not square like the others but an irregular lozenge, the object being to form a lip or spout to the dish, to pour from. Now place the gutta percha on a table with the bevelled edges downward, and run the point of a sharp penknife along a straight edge in the direction of the dotted lines in the wood-cut. The incision need not be deep, not more than one-eighth of the thickness of the sheet; it will be quite sufficient to allow the edges to be turned up to form the sides of the dish without any difficulty. This done, pass the two bevelled edges which form a corner through the flame of gas or a spirit lamp, applying just sufficient heat to make the surfaces sticky throughout; then bring then firmly together, plying them gently into shape with the fingers, and holding them in position for a few minutes until thoroughly set. If properly done, the joint will be perfectly strong and firm. Each of the corners in succession will be so treated, and the result will be a dish neat, trim, and square, produced in a few minutes. As we have before said, we do not find the strength in any practical degree impaired by the incision made to facilitate turning up the edges. If additional strength be required, however, it can easily be obtained. Either the corners or edges can be strengthened, by cutting pieces of thin sheet to the proper size; these must be pared down at the edges so as to form a feather-edge; the edge to be strengthened and the surface of the piece to be applied must then be softened in the flame as before described and then pressed into contact with the fingers. It must be remembered that *both* surfaces to be joined must be heated, as one piece of gutta percha in a plastic state will not adhere to another which is quite cold and not plastic. If on trying the dish any leakage is observed at any of the corners, the place can easily be repaired by passing it carefully through the flame and pressing it together with the finger and thumb, or by heating a small piece and applying it to the hole, which must also be heated.

We may here take occasion to answer the queries of a correspondent in No. 40 of the present volume, relative to the construction of dishes of card-board and gutta percha. The plan he proposes of cementing the pieces of card-board by means of gutta percha, will, we fear, scarcely prove efficient. The best mode of proceeding will be to cut a piece of card-board of the requisite size and thickness to the shape of the foregoing wood-cut, with this slight difference, that the pieces out of each of the corners had better be square, as it will be undesirable to attempt to form any lip or spout. With a penknife, as before directed, make a *very slight* incision from corner to corner; then turn up the sides, and proceed to secure the corners, and strengthen the bottom edges, which are turned up as follows: take strips of tough, thin cartridge paper, and by means of good paste or glue, secure them to the corners and edges. If marine glue be used, it will make the joints waterproof; it will be found, however, a little more difficult to use. We purpose, in a future article, to describe the best modes of using it for a variety of purposes. The joints being secured, the dish can be strengthened and made neat by covering it inside and out with cartridge paper. It may then be made waterproof by means of a solution of gutta percha. The proportions of gutta percha and benzol to form the solution must be left somewhat to the discretion of the manipulator; we may remark, however, that gutta percha in the same proportion will make a much thicker solution than most of the gums or resins. If the gutta percha be tolerably pure, having very little impurity to precipitate, a drachm to an ounce of benzol will form a tolerably thick solution. To prepare it, the gutta percha should be cut up into very small pieces or thin shavings, and immersed in the benzol, the bottle containing which should be very lightly corked and placed in a vessel of hot water. Without the aid of heat, the process of dissolving will be very slow and incomplete; and if the bottle be tightly corked the expansion of the benzol will cause some danger of explosion. The solution will be more limpid and easy to use whilst it is warm. The best method of applying it to the card-board dish will be to pour it in and allow it to run over the entire surface, and then return the residue to the bottle. When this is dry, the process may, if necessary, be repeated. The dishes so formed will be light, and for some purposes useful; but they will not bear rough usage.

Perhaps the most efficient method of rendering such card-board dishes waterproof would be to cover them inside and out with the gutta percha satin tissue about the thickness of paper. To do this, two pieces should be cut of the same shape, but slightly larger than the card-board, so as to allow the joints to overlap. Instead of the flame of a lamp, a piece of thick wire heated would best answer the purpose of forming the joints.

(*To be continued.*)

THE distance of the moon from the earth is about 240,000 miles; and if a railway carriage were to travel at the rate of 1,000 miles a day, it would be eight months in reaching the moon. But that is nothing compared with the length of time it would occupy a locomotive to reach the sun from the earth; if travelling at the rate of 1,000 miles a day, it would require 260 years to reach it.—*Curiosities of Science.*

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 18*th July*, 1859.

A NEW volume of Arago's posthumous works has appeared since my last letter was posted to you. This new volume contains a letter from Arago to the Minister of the Interior on the discoveries of MM. Nièpce and Daguerre; it is dated 1839, and will doubtless be read with interest if it be true, as I am informed, that this letter is now published for the first time. It runs thus:—

"MONSIEUR LE MINISTRE,—After fifteen years of assiduous, delicate, and expensive researches, MM. Nièpce and Daguerre have at last been able to fix the images produced in the camera obscura—to employ the solar rays themselves for drawing—to give birth in four or five minutes to pictures, in which objects preserve mathematically their forms, even to the minutest details; in which linear perspective and variety of tones are produced with a degree of fineness hitherto unknown.

"I do not exaggerate when I affirm that the method which M. Daguerre has finally hit upon, gives most admirable results. Unhappily for the fortune of this talented artist, the method cannot become the object of a patent. As soon as it shall be known, every one will be able to apply it; the most clumsy operator will be able to take views as perfect as those of an experienced artist.

"The author of so fine, so unexpected, and so useful a discovery, has certainly done honour to his country, and his country alone can recompense him.

"I know personally that M. Daguerre has refused certain seducing offers made to him in the name of several powerful sovereigns. This circumstance cannot fail to augment the interest which every one takes in him. It will increase, in the Chambers, the number, already so great, of persons who only await an opportunity to show the sympathy they bear towards the unhappy inventor of the photogenic process and of the diorama.

"I take the liberty, M. le Ministre, of asking you if the report be true that you intend to solicit the Chambers for a national recompense in favour of M. Daguerre.

"I most ardently desire to receive an affirmative answer, in case of which I put myself entirely at your disposal, both for the preliminary stipulations and for the discussion that such a proposition might give rise to.

"In the supposition that, contrary to my expectations and my wishes, you should not think it proper that the Government take the initiative, you will not consider it wrong, I hope, if, acting according to a desire which has arisen from every seat in the Chamber of Deputies, I should endeavour myself, by a formal proposition, to interest that Chamber in the discovery of our ingenious fellow-countryman."

Thus we have an example of the manner in which the French protect one another. The volume from which we have just extracted the above letter forms the 12th volume of Arago's works, published so rapidly by MM. Gide and Barral; it is certainly one of the most interesting.

In one of my former letters I mentioned a new process of photographic engraving, which has since been more fully explained in the "PHOTOGRAPHIC NEWS." This process, which we owe to M. Berchtold, has, according to the journal *La Lumière* of the 2nd July, received a new application. By employing a negative as type, this artist has been able to work upon metallic plates deep enough to produce *relievo* engraving similar to woodcuts, without sacrificing the harmonious tone of the whole. The metal preferred is zinc, and the printing of it is not more difficult than ordinary woodcut printing. M. Ponçon recommends chloride of lime, made into a paste with a little water, as a rapid and easy means of effacing from the fingers of photographers the dark stains of nitrate of silver.

On the nights of the 13th and 14th of March last, a certain frog deposited a considerable number of eggs or spawn, from which, in the course of a few days, a number of tadpoles were developed. Two of these were chosen by M. Vulpian, for an experiment. One of them, a stout tadpole, had his tail cut off on the 28th of March; the other had *his* tail cut off on the 29th. The tail of the first tadpole *lived* for nine days, and died on the 6th of April; the tail of the second lived one day longer, and died on the 8th of April.

M. Vulpian assures us, that last year the tails of tadpoles were endowed with a stronger vitality, for he observed some of them to live for eighteen days after they had been separated from what we may, perhaps, be allowed to call the body of the tadpole.

As this subject is not devoid of interest, and forms, in fact, part of an important physiological question, M. Vulpian has lately devoted a good deal of attention to it. First of all, it was necessary to ascertain the precise state of the tail the moment it is separated from the tadpole. As the latter were very young when M. Vulpian began his observations this year, everything in the tail was in a rudimentary state: the elements of the vertebral axis and the muscles were only sketched in, as it were; there was, at least, in the anterior part of the tail, a prolongation of the spinal marrow in an embryo state; no nerves or blood-vessels were to be seen, and probably the aortic trunk only was, as yet, formed. The epithelium and all the adjacent cells were full of vitellinous granulations; the epithelial cells contained, moreover, numerous granules of pigment, and were supplied with vibratile cilia.

In such a tail separated from the body of the animal, no movement could be produced by the application of slight external excitement.

During the first few days after its separation, the tail becomes flat and elongated, the wound made by the section heals up, and by the intense vegetative activity of the cells at this point, a new part is formed which augments each day in dimensions.

The epidermic ciliated cells multiply rapidly, and soon cover completely the new part just mentioned, which goes on growing; at the same time, the granules of vitellinous matter, and of pigment contained in these cells, diminish in number, so that the epiderm becomes more transparent, and allows us to observe the parts underneath. Now the axis of the tail becomes more distinct, and a fin is formed; in a very few days blood-vessels appear, muscular tissue develops itself, and the slightest irritation produces a certain amount of movement—a circumstance which proves that the rudiment of a spine contained in the tail has also been developed.

In about three or four days after the tail has been separated from the body of the tadpole—when the vital activity appears at its maximum—we have in this tail, as it were, a complete animal, breathing by the skin, nourishing himself with the vitellinous granules which are contained in all the cells, and manifesting reflex motion when excited externally—and even during the latter part of his existence, motion is observed without any external excitement at all.

Life diminishes, and finally ceases in this tail, probably from two causes: first, from the accumulation of materials that have served their purpose and should be ejected; secondly, from the diminution of vitellinous granules, by which alone the tail is nourished.

A discussion has been begun lately before the Paris Academy of Sciences as to whether the globules of vapour which constitute clouds, steam, fogs, &c., are liquid particles of water, or whether their envelope only is liquid, the interior of the little sphere being filled with a gas.

To explain the suspension of clouds, M. de Saussure, the once celebrated physicist, imagined cloud-globules to be hollow spheres of water of extremely small dimensions. He actually measured their diameters under the microscope, and, we believe, pronounced them to be elastic, like an india-rubber ball. In fact, observing minutely the steam which rose from a warm cup of coffee, he found that some of the globules rose whilst others fell and rebounded from the surface of the liquid. Sir Humphry Davy was the first, we believe, to prove that De Saussure's explanation was unnecessary, and that it was infinitely more probable that cloud-globules are liquid throughout, and not hollow spheres at all. Sir Humphry Davy's views have been proved to be exact by certain mathematical and meteorological considerations developed in France, first by the Abbé Raillard, afterwards by M. de Tessan.

If we were asked how is it that clouds remain suspended in the air, if the globules of which they are composed are liquid drops of water, so much heavier than air, we should be apt to reply, without mathematics, and in the Scotch fashion—how is it that finely-pulverised chalk will remain many days suspended in water, although it is so much heavier than the latter? Next comes the consideration; if the globules are hollow spheres, what do they contain in their interior? Not vapour, assuredly, for vapour condenses in contact with water. Do they contain air? That is likewise improbable: when we blow a soap bubble with a common tobacco-pipe, we produce a sphere of water filled with air, and we observe that its existence is excessively short; water constantly evaporates from the exterior surface of this sphere, and the liquid envelope soon becomes so thin that it bursts! It is absurd, then, to think that cloud-globules filled with air could exist more than five minutes. But the most serious, or apparently serious, objection to Sir Humphry Davy's theory was the following:—It was remarked that *rainbows* never showed themselves in clouds—a certain proof, it was thought, that cloud-globules are hollow, for if they were liquid throughout like the drops of rain, why should they not give rise to rainbows? The answer is simple enough: they *do* give rise to rainbows; and the reason why it is so difficult to observe the latter in clouds, is on account of their great distance from the observer. This may be proved experimentally: if we place ourselves between the sun and a garden fountain, so as to obtain a rainbow in the spouting water, by retiring from the fountain the rainbow becomes fainter, and finally disappears completely. Must we conclude that because we do not see it, it does not exist?

For the time being, therefore, the question is solved: cloud-globules are liquid drops, of various sizes. My distinguished friend M. Daubrée, Professor of the Faculty of Sciences of Strasbourg, some years ago searched for arsenic, and found it in many different kinds of rocks; but more especially in mineral combustibles (coal, lignite, &c.,) belonging to different strata. He found, at that time, that the tertiary lignite of Lobsann (Bas-Rhin) was uncommonly rich in arsenic: certain samples of this lignite were found to contain as much as 0·002 and 0·008 of their weight of arsenic. These observations have lately been confirmed by the same eminent philosopher, and under circumstances that deserve to be made known.

A limestone strongly impregnated with bitumen alternates with the lignite of Lobsann. This limestone forms the principal element of a kind of bituminous mortar, employed in the neighbourhood for different purposes. For some years it has also been employed to obtain certain pyrogenous oils, which are produced by a process of distillation. When the alembics which have been used in this distillation are taken down, the interior of the tube through which the oils distil, is often seen to be incrusted with a curious deposit produced by the gradual condensation, outside the furnace, of certain volatile substances. This deposit or sublimation was found upon examination to be pure arsenic, crystallised in rhombohedrons; it attains sometimes as much as two centimetres in thickness, and in the course of some months it will completely obstruct the necks of the retorts.

It was found that the arsenic thus deposited forms about one-millionth part in weight of the rock which is submitted to distillation. But the arsenic contained in the limestone in question, is not entirely condensed in this manner; a notable quantity distils over with the oils. In what state it exists in these oils is not yet known. It is well to be aware, however, that arsenic does exist in them, as they are constantly employed for burning in lamps, &c.

The state in which arsenic exists in the bituminous limestone of Lobsann has, however, been ascertained with certainty by M. Daubrée, and in a very ingenious way. By alcohol, or any other appropriate solvent, the bitumen is dissolved out of the limestone; then the carbonate of lime is dissolved in its turn by diluted hydrochloric acid, when a residue, consisting of very fine non-crystalline particles, and amounting to about two per cent. of the weight of limestone employed in the experiment, is found to remain undissolved. These particles consist of *arseniferous iron-pyrites.*

It is well to note here that M. Daubrée formerly discovered arsenic in the limestone of the coal-formation at Villé, in France, and found that it was contained in the rock as minute crystallised particles of mispikel (arsenuret and sulphuret of iron), the small crystals of which were perfectly recognisable.

Photographic Societies.

Photographic Exhibition at Aberdeen.

We have been requested to call the attention of our readers to an intended exhibition of photographs at Aberdeen. The period chosen for this exhibition has been selected with the shrewdness for which our brethren on the other side of the Tweed are famous. Under ordinary circumstances, the visitors to such an exhibition would have been almost entirely confined to the residents of Aberdeen, so that the inducement to photographers in England to send prints would not have been sufficiently powerful at this season of the year, when all are so much occupied either in excursions about the country, or in preparations for such excursions. The managers of the intended exhibition, however, by selecting the time when the British Association holds its meeting in Aberdeen, have insured for English exhibitors an audience which they might fail to obtain even at the London Exhibition. The terms on which photographs are received are not very onerous. Coloured photographs are the only ones excluded, and supposing the positive to have been touched, or the negative from which it is printed, it is only necessary to state the fact. It is scarcely necessary, we presume, that we should advise the adoption of the recommendation of the committee, that all prints should be framed and glazed, as well as the other points which will be found detailed at length in the advertisement in another part of our pages. There is one point on which we would offer a suggestion: the circular says, with reference to the prints, "They should be marked on the back with the names of the subject, the process (collodion, waxed paper, &c.), the artist, and the owner." Instead of marking this information on the back, it appears to us that it would be much more useful if it were written on the face. If the owner objects to the defacement of his proof, this might be written in pencil, or on a separate slip of paper, so as to be easily removed after the termination of the exhibition.

It is not intended that the exhibition shall be confined to photographs only; makers of photographic apparatus who may have objects of new or improved construction are requested to send them to be exhibited before the 1st of September, by which date prints also must be sent.

We trust that any of our readers who may have prints which they may consider worthy of a place in an exhibition where they are likely to be seen by so many intelligent critics will not fail to forward them to the address given in the advertisement. We can with more confidence recommend them to do this, that they are not called upon to do it at their sole expense; the honorary secretary, Mr. J. White, undertaking that they shall be carefully repacked and returned free to the owner.

We think it would be a good plan, if Mr. White is aware of some of the special subjects which will be brought forward at the meeting, for him to state it, as it is possible that prints specially interesting in consequence of their illustrating a scene or a geological formation, might be forwarded, which, otherwise, the owner might not think it worth while to send, as the general impression with respect to the suitability of prints for exhibition is their possession of the quality of prettiness.

Miscellaneous.

Latest Foreign Art and Science Intelligence.—*Humboldt's Family Burial Ground, Tegel, near Berlin; his last Writings.*—Besides the loss of that *savant*, which is one universally felt, Europe has sustained a collateral one in the purchase of his huge library, by the United States Government, for the sum of 40,000 dols. This is an irreparable loss, as M. de Humboldt had occasion to collect in South America so many rare books and documents, as cannot be replaced any more. Besides, this collection comprises an immense number of engravings, maps, plans, &c., which are all going westward, to a new centre of civilisation.—We have seen an engraving of Humboldt's last resting-place, in the palace garden (*Schloss Garten*), at Tegel, where he reposes now with his also great brother William. On a fine parterre, surrounded by a circle of trees, rises, on an appropriate base, a column, surmounted by a statue representing Nature. Around this monument lies the family burial ground of the Humboldts, encompassed by a simple, yet pretty iron railing. Within this space, Alexander Humboldt is buried in the ground, as he wished to repose "in *free* nature;" an expression of which he was particularly fond, and used it very often. Amongst the last (if not the last) of Humboldt's occupations was the writing of a preface to a German translation of his journey, "Rélation Historique," which appeared first in 1817, in French. It is dated 26th March, 1859, and contains the following passage:—"Natural history, like Nature herself, is engaged in a continual change of existence. Since the appearance of the first volume of my Journey, forty-five years have elapsed. New additions, therefore, will be numerous; in a geological point of view, an account of the fixing (*Bestimmung*) of the various rock formations, and the metamorphosed mountains, as well as relative to the beneficent influence of chemistry on geology; and, in fine, as relates to the distribution of heat over the surface of the globe, and the causes of the diverse curves of the monthly isothermes." What sort of *translations* are generally made of works of great men, may be learned by an expression of Humboldt himself on the *former* translation of his *Relation*. He called it "a blotch work, such as he never could take in his hand."

Panama.—In the vicinity of Huatalco, in the Isthmus of Tehuantepek, the ruins of an old *Aztec* town have been found. They consist of fortifications built of stone, and of other most valuable antiquities. [All the hitherto published delineations of American *aboriginal* monuments are exceedingly meagre and faulty.]

Berlin—the Palace.—The Palace of Berlin had been built by Frederick the Great, during his struggles of war against Austria. On the western portal, the following *distichon* has been re-gilded of late, and thus has become visible:—

> "Hæc sunt Friderici molimina: medio bello
> Condidit is tantam belligerando domum;
> Victori respondit opus: debebat in urbe
> Non aliter Prussus Mars habitare arce."

Gent Art Exhibition.—Besides the fair and the target shooting of the Burghesses, the triennial art exhibition has also taken place at Ghent. The catalogue comprises 600 articles: the best are an Evening in High Mountains, by Steinecke, of Düsseldorff; an Italian landscape, by Bromier, &c. [It is to be observed, that almost all art exhibitions on the Continent are now open to the whole world.]

The Holy Land.—Mr. H. Scherer, who has explored the East most minutely, is now publishing, in the *feuilleton* of a German contemporary, a most interesting account of his journey.

Christiana.—The best Norwegian sculptor, Hans Richelson, has recently died aged 70.

Most Important Invention.—Mr. Auer, of Vienna, director of the huge paper-money printing offices of the Austrian government, but a man known as the inventor of nature-printing, has made another invention, which, if practically verified, will be another step towards the advancement of the *mechanical* part of literature. The fabrication of endless paper sheets has been known and extensively practised some time ago. Now, it occurred to Mr. Auer, that the whole process of rolling and unrolling, of preliminary cutting, &c., could be saved, if some means could be devised to print the paper as it comes out of the *womb* of the paper-making machine. This, therefore, would be the *ne plus ultra* of printing expediency—next door, if we may say so, to printing by enchantment. The German periodicals, whence we derive this notice, have hitherto given only a superficial description of Mr. Auer's new machine, which, when more complete information reaches, shall be communicated to our readers.

Berlin—A Projected National Gallery.—At the meeting of the Royal Academy of Arts, Berlin, the plan of a National Gallery was taken into consideration, the necessity of which had been long felt. After the Senate of the Academy had assented to the proposed plan, the assistance of the Home Secretary was requested and obtained. A call was then made on the Artistic corps at Berlin, Düsseldorf, and Königsberg, to select members for the consulting committee, which has to mature the plan.

Paris—Academy of Arts—Prize Distribution.—The yearly distribution of prizes took place on the 16th inst., with all that *éclat* usual with our neighbours. The Home Secretary presided, and was supported by the Director General of the Imperial Museum, the members of the Academy, and the keeper and assistant keeper of the Museums. M. Fould delivered a discourse, as did also Count Nieuwerkerke. The prizes were allotted to sculpture, architecture, engraving, and *lithography*. As the latter art is also of recent origin, heliography will, we trust, also take up its place in due time.

Berlin—The Humboldt Memorial.—Some Prussian Cabinet Minister, members of the Academy of Science, and others, have joined into a society, to collect a fund destined for the encouragement of travellers to distant countries, in memory of the great defunct. The programme, signed by the first men of Berlin, states that they are aware of the difficulty of putting into existence a similar undertaking in times so difficult; yet "we do not hesitate to continue, in times troubled by war, the everlasting problem of science, the common tie of nations." It is the Academy of Sciences, at Berlin, who has undertaken the management of the affair, and subscriptions are to be addressed to the firm of Mendelsohn and Co., Berlin.

Lignitz Silesia.—The celebrated art and antiquity collection of General Minuto, who has made considerable researches in Egypt, but which extend over many other branches, will be sold by auction on the 1st August, and the following days.

Simplification of Apparatus.—We must confess with surprise, that the ingenuity of the mechanist has not kept pace with the research of the chemist—more particularly in those smaller inventions and adaptations of apparatus that are especially the province of the "handy-man;" for in the higher branches of mechanism, which partake largely of the scientific, such as the construction of lenses, &c., but little remains to be wished for. It is in the devising such apparatus as simplify manipulation, lighten a man's load on the hill-side, and enable him to wander with the least possible *impedimenta* from spot to spot, that improvement is most needed. We would wish to see the practice of travelling photography assimilated as much as possible to the freedom and ease of the sketching-block and moist-colour box; and though this is, perhaps, a little too much to expect, we believe that a very much nearer approach can be made to it than is generally imagined. The shops of photographic apparatus-manufacturers, resplendent as they are with polished mahogany and glittering brass-work, are sadly deficient in those little contrivances without which a photographer had needs be as *habile* a *prestidigitateur* as the great Robert Houdin, before he can hope for success.—*Irish Metropolitan Magazine.*

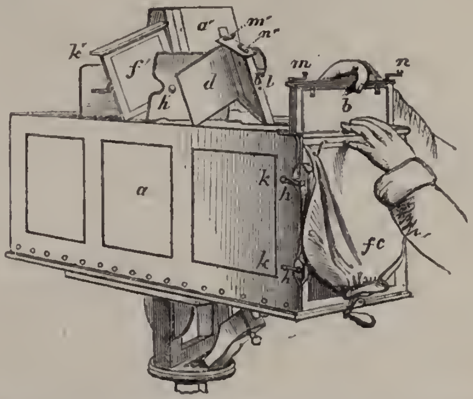
Photographic Notes and Queries.

IMPROVEMENTS IN THE PHOTOGRAPHIC CAMERA.

Sir,—Permit me to notice some omissions (page 164) in your report of my observations at the last meeting of the Photographic Society. I did not commend Mr. Malone's frame for the focussing glass, though it looks neat and compact, for I think it is liable to warp. I said that Daguerre originally had a door to the back of his camera, but I added, that the French, being too nice, and fearing that the current of air caused by the opening and shutting of the door would raise a dust, they *adopted the slide in lieu of the door.* I then said, that having my own cameras made with doors, and not being in the least inconvenienced by any dust, the fear of the French need not be entertained.

As regards the description of my camera, I beg you will allow me to supply, with the annexed cut, what at the meeting I find was not sufficiently explicit:—

A is a 12-inch square camera, and a' a 5-inch one; f and f' are the focussing screws, held in position by the elastic bands h, which are slipped over projecting knobs k; b b' are the backs; b is in the act of being slid down between the body of the camera and the screw, which it displaces; b' shows its inner door d open—the position it assumes during exposure. This door is opened and shut by means of the lever m; when closed, the bolt l is turned upon it 90° by means of the other lever n, which slides over a spring catch, and is prevented thereby from going back. The back is then ready to be withdrawn from the camera.



Attached to f is fc, a focussing cloth which consists of a black velvet bag; one end is fastened to f, and through the other end runs an elastic ring, which admits the head of the operator.

And now, sir, I come to the objection to swing-backs. With all due deference to Sir David Brewster, Messrs. Shadbolt, Malone, and others, the swing-back, or, according to Mr. Shadbolt, the front of the camera in the form of a cheese (a Dutch cheese, I suppose), is wrong in principle.

The axis of the lens ought always to be at right angles with the ground glass, and likewise as much as possible with the supposed plain, in which the object to be copied is situate. In the case of several objects in different plains, therefore, the camera must be inclined bodily towards the combined objects, putting the chief object in best focus, to the comparative neglect of the rest (if stopping is impracticable); then the chief object at least will not be distorted. But the moment the parallels m between the lens and the focussing glass are disturbed, *every portion in the whole image is distorted.*

The common experiment with a burning glass between any plain and the sun, will suffice to prove this. So long as the common axis of the sun and the lens is at right angles with the plain, the image of the sun is depicted as a circle; but, so soon as you incline either the lens or the plain, the sun is represented as an eclipse. N. Ennel.

GUTTA PERCHA DISHES.

Sir,—You invite contributions on the subject of gutta percha in connection with photography. It is open to great objection from its property of constantly contracting its dimensions. Built-up troughs soon become useless; they part at the seams, and though easily enough refastened, they are soon again out of order, and, from the trouble they give, are practically worthless.

Troughs moulded in one piece are far more satisfactory; but, from the same cause, soon get out of shape, and become no longer flat, so that a much larger quantity of the photographic chemicals are necessary in using them. To compel them to a comparative flatness I have, for several years, been in the habit of damping them to a board. This, also, renders them more safe to move; for when they have become contracted, and are, as it were, constantly labouring for a relieved position, they are very apt to take a sort of twist whilst in one's hands, and throw their contents about the floor.

I have one gutta percha tray, which, when made, was about 46 inches in length and 14 inches in breadth. It is now (after about three years' use) *two inches and a half shorter*, and nearly half an inch narrower than at first.

F. L.

SEDIMENT IN THE FOTHERGILL PROCESS.

Sir,—Having practised Fothergill's dry process, and obtained the most beautiful results, I beg to seek your valuable aid and assistance, which you so kindly give to all who are in difficulties, for the only drawback which not only myself but others have met with, which is a kind of sediment that settles upon the plate during the developing, and all the washing you can give will not remove it. I keep the plate in constant motion, and change the developer frequently, and as often as it in the least changes colour, yet with all the care it will occasionally make its appearance, and completely spoil the negative.

It does not arise from any light getting on the plate, and I get some negatives quite clear of it by using the same developer.

I use the developer recommended for this process, 1 grain pyro., 20 drops acetic acid, 10 drops alcohol, and 1 ounce water, with two or three drops of *pure solution* of nitrate of silver to the drachm.

J. Jopling.

OXYMEL AND SUGAR PROCESS.

Sir,—If Mr. Witham (page 191) will, after making his preservative sugar solution, as he describes (which is very good), add three ounces of water to one ounce of his syrup, he will find it to be sufficient. If, also, he will add (as Mr. Llewellyn recommends for his oxymel process) a grain and a half of nitrate of silver to two ounces of his diluted syrup, and also half a grain of citric acid to three ounces of such solution, he will find he has attained the most easy, certain, and perfect of dry processes. After the collodion is excited, wash the plate gently in distilled water, then take an ounce or less of the above sugar solution and pour it five or six times over the plate. Set the plate up to dry, and it may be used a long time afterwards. It gives perfect results. I have recently got a distant landscape, on a plate 8×10 (with a good lens, and collodion, and four minutes' exposure), a perfect result. This plate was prepared two days since, and I developed it when I came home to-day, after some hours' interval after exposing.

J. F.

INJURIOUS EFFECT OF A GUTTA PERCHA DIPPER ON THE BATH.

Sir,—Allow me, as you are on the subject of gutta percha, to relate a fact to you. A gutta percha dipper was in use in a 170-ounce bath; it was left therein for some time, and, the next time of trying the bath, was found ruined. The cause was that within the said dipper was a piece of thin iron to strengthen it, and there was a crack in the gutta percha which did the mischief.

S. E. C.

COPYING CAMERA.

Sir,—"Captain S. S. B.," who inquires in your last number about the dimensions of an "enlarging camera," would find that described in pp. 127 and 189 of your first volume,—a very useful size and easily constructed, if the inner camera be fixed by means of the wooden screw (to that part of the large camera which draws out) to the end farthest from the focussing glass. By causing the lenses to approach to, or recede from the negative, it may be enlarged to any required size; the size should be marked in pencil on the ground glass.

Thomas Barrett.

ANSWERS TO MINOR QUERIES.

Shelves for Holding Negatives.—*A Beginner.* A very convenient and secure receptacle for your increasing stock of glass negatives may be made in this way. Fit up, in some convenient part of your dark room, shelves of various width, according to the size of the glasses, and having grooves in them above and below (similar to a plate box), so that the glasses shall stand on their edges in them. A door with a lock and key should be provided for the double purpose of excluding dust and preventing damage from the hands of prying friends.

Test Papers.—*N. W. W.* In using test papers observe the following precautions:—They should be protected from the action of the air, or they soon become purple from the action of carbonic acid, which is always present in the atmosphere in small quantities. By immersion in water, containing about one drop of liquor potassa in four ounces, the blue colour is restored. Test papers prepared with porous paper show the red colour better than those made with glazed or strongly sized paper. If the quantity of acid present is, however, small, it is not sufficient in any case simply to dip the paper in the liquid; a small strip should be thrown in and allowed to remain for ten minutes or a quarter of an hour. If the paper, on immersion, assumes a wine red or purple tint in place of a decided red, it is probably caused by carbonic acid gas. In that case the blue colour returns when the paper is washed and held to the fire. Blue litmus paper may be changed to the red paper used for alkalies by soaking in water, acidified with sulphuric acid, one drop to half a pint.

TO CORRESPONDENTS.

Churk.—1. White wax, when perfectly pure and free from adulteration (no easy thing to get, however), is without action upon a nitrate of silver bath, if kept in a tolerably dark place. 2. Several persons have experimented in the direction you point out, but hitherto with very little success. The difficulty is to preserve the white parts clean.

Justin.—We fully agree with your sentiments, but, at the same time, are of opinion that the discussion should now drop.

A. B.—1. It would be impossible to advise you as to the best position for the sitter and blinds, &c., in your glass house, without a personal inspection of the building. We cannot fully comprehend your description. 2. See Mr. Hardwich's remarks on this subject in the present number. No. 1 lens is considered the best.

H. M.—1. Your plans and description arrived quite safely, and, but for an oversight, would have been acknowledged before. We are much obliged for them, and, probably, may avail ourselves of your permission to make them public in an early number. 2. Twenty-four hours' washing is not any too long for prints to be washed.

F H. Amateur.—The two stereograms which you have forwarded to us are very good specimens of what can be done by the Fothergill process, and are quite good enough to entitle you to join the "Stereoscopic Exchange Club."

Stereoscopic.—Your prints show that the negatives are not bad; but the printing might be improved, as at present the tones are too red to be generally liked.

S. E. S.—If you grind up the bromide of ammonium and alcohol together in a mortar, you will most likely find that it will all dissolve; at all events, any that is left undissolved may be disregarded.

M. O'L.—You could get a very good landscape lens from the maker you name for about £5, but a large portrait lens would be more expensive. Second-hand lenses are frequently advertised in our advertising columns; your best plan will be to consult them.

A Puzzled Photo.—You will find it a far preferable plan to well wash the prints on removing them from the pressure frame, and then to tone them before fixing. Several good plans in which this principle is carried out, have been given in our former numbers. Of these, the one by Θ, near the commencement of the second volume, is as good as any.

John Crabtree.—You will not succeed in taking much better pictures than those you describe, by your arrangement of lenses. The front lens of the portrait combination is not intended for landscape work; for this purpose a properly constructed view lens is required.

C. H. Paine.—Cement a few wooden laths on to the front and back of your gutta-percha bath, in such a manner that the rigidity thereby produced may contract the tendency of the bath to bulge outwards when full.

Copyist.—We are much obliged for the information so politely given, but Mr. Sang's communication on this subject is so complete as to render it unnecessary for us to avail ourselves of your description.

J. Bockett.—A half-plate lens may be attached to a quarter-plate camera, provided the latter be lengthened sufficiently to allow for the greater length of focus of the lens. The advantage of this arrangement would be, that only the centre of the field capable of being covered by the lens would be used, and thus greater perfection in the details would be gained. In our opinion, however, a larger camera should be used for this size lens, as it would always be easy to work on a small glass, if desired. 2. The nitrate of silver could not have been pure. 3. The present hot weather is sufficient to account for your materials not keeping in good order so long as they usually do.

T. Clark.—Received with thanks. See answer to *Justin*.

A. Watt.—Our correspondent's interesting article on collodion has arrived too late for insertion in this number.

Communications declined, with thanks.—F. Lake.—E. T. I.—A. B.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—A New Beginner.—Tyro T.—Nitrate Bath.—Pos.—F. O. U. R.

In Type:—G. M.—J. S. Overton.—W. R. R.—Viator.—E. B.—M. A. Root.—G. H. W.—Peter Positive.—Artizan Amateur.—H. and J. Walter.—A. F. Stafford.—Thomas Warwick.—B. C. H.—R. A. W.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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THE GREAT COLLODION EVIL.

BY ALEXANDER WATT.

There is probably no chemical art which is so uncertain in its results as photography: even in the hands of the most skilful, it is always fraught with uncertainty and doubt; and there are many reasons why the artist cannot thoroughly depend upon obtaining uniformly good results, amongst which may be ranked first in importance *the want of uniformity in the collodion.*

It matters not who may have manufactured the collodion we employ—whether it be A, or B, or C, or the artist himself—there is always observable a vast difference between the article of to-day and that employed a week ago, although they may both have been procured from the same establishment, or made under the same formula by yourself. The best makers sometimes turn out a collodion which is almost utterly worthless, whilst at other times they will supply you with an article which cannot be surpassed. This is quite a lottery.

It is therefore advisable that we should turn our attention to some means by which we may obtain collodion uniform in quality. For my own part, I would rather work with an uniformly bad collodion than one which was excellent to-day and vile to-morrow.

I do not conceive that there is any special cause for the variation in quality of this substance, but am rather inclined to attribute its want of uniformity to *many* causes. Among these I may suggest:—

1. Ether varying in quality.
2. Pyroxyline being seldom made twice alike.
3. The iodising solution prepared with alcohol of various strengths.
4. The ether sometimes being prepared from methylated spirit.
5. The collodion being mixed at different temperatures and iodised under similar circumstances.

These I imagine to be some of the causes of collodion wanting in uniformity.

Now, although it is an Englishman's prerogative to grumble, it is also his right, when he has become satisfied with grumbling, to suggest a remedy for that which offends him; and I trust that collodion-makers and photographers will take in good part the few hints I am now about to offer them.

In making a batch of collodion, I would recommend the adoption of the following plan, and, let the collodion be prepared from whatever formula it may, I have no doubt that an uniform or *average* article will always be the result.

In the first place, in order to ensure uniformity of the ether, I would advise that it be procured always from several establishments, and let these then be mixed together.

Next, a quantity of pyroxyline or xyloidine should be carefully made, and, when dry, set aside in a box made of slate or other suitable material. Another batch of pyroxyline should then be made and this thrown into the box with the first lot, and so on, until several batches have been prepared, when they should all be carefully *mixed.*

The iodising solution should be made of various samples of alcohol, and be kept always at a moderate temperature (say about 50° Fahrenheit); and, before it is added to the collodion, the clear solutions should be decanted into a larger bottle, and be allowed to remain quiescent for several hours. When it is necessary to iodise a portion of the collodion, it should be ascertained if there are any crystals of the iodide attached to the sides or bottom of the bottle, which is very likely to be the case when the alcohol employed is anhydrous, and it should be carefully ascertained *what is the exact amount* of iodide that is added to the collodion, as much depends upon this, and the amount of course, to ensure uniformity, should never be allowed to vary. I think this point has been much overlooked, for when I have complained to a manufacturer that I have found a considerable deposit of crystals of iodide in his collodion, he has invariably remarked, "Oh, have you? Let it stand aside for an hour or two to settle." But I have found in several instances, especially in warm weather, that it has required to stand for several days before the collodion has been in a condition fit to use, and when I attempted to sensitise a plate with the collodion while in this state, it has been covered with transparent spots, evidently caused by the small crystals of undissolved iodide floating about the collodion. It would be well to keep the iodising solution in a graduated bottle, so that in case it loses by evaporation at any time, fresh spirit may be added to reduce the solution to the required strength.

By the above arrangement I have no doubt that collodion may be made from time to time with but little variation, if any, in the result. A manufacturer with a little extra trouble and care may always be able to obtain an *average* quality of ether, alcohol, pyroxyline, and iodising solution, and if this is *always* his practice, I think it will be almost impossible for his collodion to vary much at any time.

During the last few weeks I have extensively employed negative collodion made by seven different makers, and these have varied so much that the collodion obtained at the same house on five or six occasions each time possessed entirely different characters; in fact, one might naturally conclude either that the manufacturer used a different formula every time, or that he made it by the very uncertain process termed "guess-work."

Now, in proof of the advantage which may be derived from an admixture of the various substances employed, so as to gain an *average* sample of collodion each time, I have for years, whenever I have found A, B, or C's collodion work indifferently, mixed them all together, sometimes adding a little ether and alcohol, and I have always found that I thus obtained an article which would give me good results.

Some collodions, as no doubt the readers of this journal are aware, are more glutinous than others, and so much so that, after employing a thin collodion, it is quite unpleasant to work with a thick glutinous compound. But if two collodions possessing such different attributes are intimately mixed, a medium article is obtained, which I have generally found to work better than either separately.

Again, some collodions are apt to give too much half tone, whilst others are deficient in this respect; therefore, if two such collodions are blended, a "happy medium" is the result.

Whether the collodion be iodised with cadmium, ammonium, or potassium, neither of these salts is antagonistic to the other, consequently, no decomposition can result from mixing them; and I have found that, by mixing a collodion which has been iodised with cadmium—which does not become discoloured for months—with a collodion which has been iodised with ammonium or potassium, the mixture has represented, in appearance and in lasting qualities, a *mean* between the two, and it has generally formed a very active and agreeable compound to work with.

When we find that it is difficult to depend upon any particular collodion, I think the safest way—in order to ensure *uniform* results—is to purchase some of this substance from half-a-dozen different makers, mix them all together and use the mixture on the following day; and if this plan is adopted, no matter how one or other may differ a little, we shall obtain an *average* collodion, and thus be able to work with a greater chance of obtaining uniform results—"a consummation devoutly to be wished."

PHOTOGRAPHY CONSIDERED IN RELATION TO ITS EDUCATIONAL AND PRACTICAL VALUE.

BY ROBERT HUNT.

* * * * * * We have not now to speak of any remarkable discovery, or to note even an especial achievement in photography. Of discoveries, we are not aware that there have of late been any; the scientific investigation ceased, or nearly so, as it always does, as soon as the art assumed that importance which makes it commercially valuable. All the manipulatory details have been carefully studied, and the causes of success or failure worked out with the utmost diligence, until an exactness has been secured, in the hands of the skilful, which almost surpasses belief. Not merely can the good photographer depend upon every plate he prepares, but he can prepare them at his ease and at his leisure at home, pack them in his portfolio, travel without encumbrance of chemicals, and develop his picture on his return. It was but recently that we witnessed such an experiment. Thirty collodion plates had been prepared; these, and the camera obscura only, were taken to the Continent. Thirty invisible pictures were brought home, every one of which proved, when developed, to be excellent photographs. Another advance, dependent entirely on manipulation, has been made. We have long possessed beautiful views of cities, of temples, and of palaces, but they were lifeless. The plague may have passed like a destroying angel, leaving the streets of the city desolate, turning the temples into tombs, and making the palaces the sad abodes of solitude and silence. These pictures are like the poet's Greece—

> "So coldly sweet, so deadly fair,
> We start, for soul is wanting there;
> *Theirs* is the loveliness in death,
> That parts not quite with parting breath;
> But beauty, with that fearful bloom,
> The hue which haunts it to the tomb,
> Expression's last receding ray,
> A gilded halo hovering round decay."

Pictures have now been taken of a London thoroughfare, with its noonday crowd. We have realised what Daguerre vainly hoped, when, in 1841, he informed the writer of this article that, *by means of my new process it shall be possible to fix the images of objects in motion, such as public ceremonies, market places, covered with people, cattle, &c.* This has now been effected by the collodion process. In one half of a second the prepared plate has been impressed with all the thousand details of the buildings and their adornments; men, women and children, cabriolets, omnibuses, carts, and horses, have all left their impressions upon the tablet. The human eyelids open and close less rapidly than the screen in front of the lens in the camera-obscura; in each case a picture of every external object is formed upon the retina of the eye, and upon what we may call the retina of the camera; a physical effect in one case, and a chemical effect in the other, gives to the mind a correct impression of everything which the sun has rendered visible. Add to this the use of the Stereoscope, and we may reproduce in all solidity each object in nature. Such is the position in which we find photography at the present moment. Let us consider its real value, first to art and then to the arts.

The Artist, looking at a photographic picture, may learn some of the mysteries of light and shadow which cannot be arrived at by any other study. If, especially, he examine the sun picture with a lens, he will discover that the effect of solidity is given on a plane, in a manner which it is the perfection of art to imitate, by a simple gradation of shadow. If he brings the stereoscope to his aid, he then calls into play some physiological phenomena, with which it is not our purpose at present to deal. The simple, single photographic picture teaches the combination of infinitely minute detail with that which we technically call breadth of effect. Although we have a thousand objects faithfully represented there is no sense of littleness, such as meets us in looking at many of our Pre-Raphaelite pictures. Everything is there, but no one object obtrudes itself upon the eye. A tree is represented with all its leaves, each leaf lying in a different position, relative to the incident light, and the result is not an assemblage of leaves but a tree, in all its unity; and a tree, too, which we can at once declare to be either an oak, an ash, or an elm, or some special member of the vegetable kingdom. There is no doubt about a photographic tree; we would that we could say so about many *artistic* ones. Sir William Newton, an artist and a photographer, says—"I consider it to be a sort of duty, as an artist, to recommend the student in art *not* to take up the camera obscura as a means of advancement in his profession until he has made himself well acquainted with the true principles of his art, as well as acquired considerable power of hand, with a view to draw with ease and correctness the *outline* of any object he may wish to represent. If, however, any student should imagine that the camera will help him to this desirable attainment, without the requisite study on his part, he will find himself much mistaken, when, perhaps, it will be too late to repair the injury. I am the more desirous of directing the student in art to the foregoing observations because I am well aware of the seductive nature of the practice of photography, and how it is calculated to divert him from his principal object in the earlier part of his studies." There is much truth in these remarks, and the want of attention to such advice is clearly showing itself in the productions of our young artists; and, indeed, there is evidence of its influence upon some of the pictures of some of our oldest *landscape* painters. There is a winning charm about the productions of photography which may well seduce the artist from his true path. The photographic picture of even the rotten stump of an ancient tree is so true—moss, fungus, ligneous structure, bark and all, are represented with so much fidelity, and all effected by light and shadow only—that the more we examine it, the more we are delighted with the result. We perfectly understand the desire of the young artist to imitate so perfect a production, and in this desire is the danger which should be avoided.

The result of taking a photographic study as a guide in the production of a work of art is that, however perfect the finished picture may be, it will want the evidence of mind. No picture was ever painted—no matter how great the mechanical dexterity may have been by which it was produced—*which could live as a work of art*, unless it bore the impress of thought. Two pictures, painted by the same hand and, one a study from nature, in which the mind of the artist has been busy, and the other a copy from the most exquisite photographic picture, will present striking differences; one would represent living nature and the other nature dead. As a means for directing the mind to observe the minute details of Nature's works, and to study how she produces her beautiful effects, nothing can be more useful than photography. There is, however, that disposition to indolence in human nature that men will be led to copy direct from the photographic picture, rather than to study it and then copy from nature; and here is the mischief that photography is doing to art. The landscape painter, using his camera obscura properly, may greatly advance his art; the historical painter may catch the best expressions of his model, ere yet they have time to fade, and, from these, advance to the study of life with the finest effects; and then using photography so far, and no farther, will lead, eventually, to highest excellence.

The Engraver, whether upon copper or on wood, should find in photography a most important aid. The process of etching upon the steel plate, of precipitating by the electrotype process, a copper plate on a matrix, of cutting through the drawing upon wood, which has been produced by photography, in the first stage, cannot yet be regarded as successful. We have duly recorded, from time to time, the particulars of these attempts, which appear to us to have fallen into a state of slumber, from which, we believe, the art may be awakened to the production of the best results. Something has been done in the directions indicated, but in either of them the study of an observant mind is yet required to secure the desired perfection.

The Sculptor, by the aid of photography, may secure within his portfolio all the marbles of the Vatican and the rich treasure of our own museums. By the aid of the stereoscope he may study these in all the roundness of reality, and trace those delicate touches which, giving the semblance of life to stone, declare the greatness of the artist's mind.

The Architect, especially, should be a student of the art of photography. It enables him to preserve examples of every fragment of ancient or of modern skill within a space comparatively small. The recent photographic exhibitions have shown us the perfections with which Egyptian temples and tombs, with their myriads of hieroglyphic characters, can be copied; those of Greece and of Rome, in like manner, are brought home to us by photographic travellers; and those remains of hood and cowl devotion, sacred to us from the memories which crowd their moss-bemantled walls, and which are at the present time the favourite studies of the ecclesiastical architects, may be secured with the utmost fidelity, and preserved in portfolios for daily reference.

The Engineer has, in many different ways, availed himself of the advantages of photography. The royal engineers have, by means of the camera obscura, secured drawings of the land and coast fortification of different countries; and these have been obtained under such conditions that an exact measurement may be made from the photograph of every, or any, part of the stronghold, which is sufficiently correct for all military or naval purposes. The rule for this is a simple one. You have a picture of a fort or a tower, which is, on your paper, we will say, one inch high; this has been obtained at the distance of twelve inches from the lens, and the camera has been three hundred yards from the object. Now, "if twelve inches give one inch, what will three hundred yards give?" resolves the problem. At the recent Photographic Exhibition the staff of engineers exhibited the results of photography in their well-practised hands. The progress of great military works was regularly recorded, the camera-obscura supplying a report in every way superior to any report from a clerk of the works. At the Ordnance Map Office, under the direction of Colonel James, the reduction of maps from the six-inch to the one-inch scale is effected by photography, saving many thousands annually to the nation in the expense of reduction by the ordinary processes. The civil engineer has, in like manner, used this art to aid him in his works; and since Mr. Vignoles and the late Emperor of Russia employed the camera-obscura to register the progress of the work at the suspension bridge of Kieff, others have had recourse to the same means of recording the advancing of large undertakings in which they have been engaged. Machinery is now frequently copied by photographic means: thus, by one impulse, in a few minutes, the most elaborate system of wheels, cranks, piston-rods, &c., can be copied, which would occupy the ordinary draughtsman days, or even weeks. Patterns of parts of machines are also copied by the camera, and as these can be sent by post, time and money are economised.

The Weaver and Calico Printer may not only employ photography to multiply their patterns, but there is a prospect that the art itself may be made available for purposes of ornamentation. The use of bichromate of potash, for producing copies of natural objects upon cotton and silk, has been on several occasions advocated, and some very promising results have been exhibited. Attention has been confined to the salts of silver, but several of the salts of iron and other metals are susceptible of photographic change, and capable of being permanently fixed, while, by their use, a considerable variety of colours may be obtained.

The Schoolmaster—regarding that functionary as the public educator in the largest sense of the word—will find in photography numerous useful aids to study. Botanical specimens may be copied with a fidelity which cannot by any other means be obtained; the minute down upon the stalk, every delicate variation of the leaf, the structure of every part, can be shown and studied with a facility which is only excelled by the natural object itself. We have recently seen selected specimens of minerals copied by the stereoscopic camera, and inspected them with the stereoscope. It was difficult to believe that real crystals of quartz, of flour spar, and baryta, were not before you, so true were they in form, in colour, and in transparency. These and similar examples of fossil remains were intended for the use of schools. The three kingdoms of Nature, in all their infinite variety, admit of being thus treated, and they might thus be used with the best effect for the purposes of instruction. With the *stereomonoscope* of Mr. Claudet these results of high relief can be shown upon a ground glass to a class of any number. "I was led to think," says M. Claudet, "that it would be possible to construct a new stereoscope, in which, looking with both eyes at once upon a ground glass, at the point of coalescence of the two images of a stereoscopic slide, each refracted by a separate lens, we could see it on the surface in the same relief which is produced by the common stereoscope." This result has been obtained in the most satisfactory manner, and, no doubt, in a short time, we shall find this new form of stereoscope in very general use for such purposes as those suggested. Those who have examined the beautiful pictures of Mr. Lake Price—"The Rod and the Gun," "Fish and Game"—cannot but have been struck with the perfection of every part. The truth to nature is really a marvellous proof of the power of photography in the hands of a skilful operator. Some recent travellers in the East have brought home a great number of casts of the faces of the different native tribes of the Himalaya range and Thibetan valleys. The difficulty of transporting those has been very great. If these men had been instructed in the use of the camera, they would have equally served the science of ethnology, by obtaining and preserving photographic portraits of the peoples amongst whom they had travelled.

The Astronomer points the camera-obscura to the heavens. The sun instantaneously impresses his image, and marks, with all distinctness, those wondrous black spots which are so strangely connected with the temperature and the magnetism of our earth. The moon faithfully draws, by her own rays, those mountains and valleys which mark her surface, indicating a period of terrific disturbance, long since passed away. All is now quiet; but the grandeur of the rock-piled hills, and the terror of the deep chasms and vast gorges, tell the tale of convulsions, such as those which are indicated to the geological student upon this planet. Photography, too, promises to lend to the solution of the problem—"Has the moon an atmosphere? Is she fitted to be the abode of organised beings?" It is thought that the photographic moon indicates an atmospheric stratum of considerable density. The planets have also been pictured by means of photography, and some new facts have been observed which had hitherto escaped attention.

The Physicist—we have no other word in the English language than this sibbilating French derivative to express this class of natural philosopher—has employed photography to register the ever-varying temperature of the day and the year; the rise and fall of the barometer are, in like manner, recorded; and the variation of the earth's magnetic intensity, however slight, are, by the agency of light, and a chemically prepared paper, detected and registered for every minute of the day.

Such are the numerous purposes to which photography has been applied. There are many others. It is scarcely necessary to mention the ordinary process of portraiture now so very common; but the extraordinary one of making the camera-obscura a detective officer, must not pass without a word. The portraits of convicted thieves are now regularly taken, and preserved in a gallery, to which constant reference can be had: thus every criminal leaves in the hands of the police unmistakable evidence against himself, to be used on a future occasion, if necessary. Photographic pictures may be adapted to the magic lantern; but we may soon expect to see the stereomonoscope employed with a similar object, and made an instrument similarly adapted to educational purposes. The solar rays fall upon the surface of the earth, and give rise to all the wonderful organisations which live and move, and have their being, upon the surface. Those rays are the supporters of life, and the developers of beauty, in form and colour. Not only do they, under the Supreme Cause, create organic forms, but they give to man the means of copying these creations in all their truthfulness. When the alchymist first noticed that horn silver (*the chloride of silver*) blackened by the exposure to the light, he little dreamed that he had made a discovery which was to lead to the great ends which now mark the photographic art. A few only of its useful and educational applications have been named. A brief contemplation of those few will prove instructive, showing the great importance of noting the most simple, apparently new facts, and proving that no new fact can be born into this world, however abstract it may appear to be, without its becoming, sooner or later, in various ways, of the greatest use to the arts of industry, and to the purposes of advancing the human mind. —*The Art Journal.*

THE SOLAR CAMERA.

We have been among the first to draw attention to a very important application of photography, which consists in producing upon the linen or canvas of a historical, landscape, or portrait painter, a rigorously exact representation or sketch of the subject which his pencil is to illustrate. It seems to us beyond a doubt, that in giving to the artist the real truth both in respect to the accuracy of the forms and design, and the fidelity of the perspective, we should double or rather centuple his powers; we should place him in a position to employ his talents and ingenuity under vastly more favourable conditions; we should almost place him on a level with the old masters, provided he thoroughly comprehended the secret of the palette, and was able to throw an appearance of life into the various expressions. During the last few weeks, all Paris has flocked to view for a last time the numerous and grand works of Ary Scheffer. We went with the rest, and up to a certain point we partook of the general enthusiastic admiration. But how many faults detract from the merits of this celebrated artist; how many striking imperfections tend each instant to throw into the shade the valued perfections! Ary Scheffer, in truth, only owed his success to the expression he threw into his heads and groups—he was pre-eminently the painter of sentiment. He drew badly and grouped badly; he hardly knew to what the effect of aerial perspective in a particular scene was due. How many times have the arms of his figures seemed to spring from the head, or behind the back! How often were the hands vulgar and shapeless, and the legs lengthened out to an immeasurable extent! . . . . . Now, supposing that a photographer has furnished Scheffer with a canvas truthfully impressed with the forms, perspective, and atmospheric effect. Nothing, evidently, would have hindered him from producing real *chefs-d'œuvre*, and it would have been no longer true to say that the engravers of these immortal paintings often added considerably to the original work of the painter.

But in what way are we to obtain, on paper or canvas, images of an almost natural size, or, at least, as large as the one usually placed on a painter's easel? This important problem has already been solved in many ways. Some have had recourse to the gigantic lenses of Lebrun, Jamin, and Voigtlander, and have set these lenses to do almost impossibilities: with them the Bissons, Disderi, and others have obtained, in the first place, negatives, and next, positives, which were not without some merit. But these monster lenses are of an enormous price; and they require a very long time of exposure, since the focal image is always imperfectly illuminated.

Another very simple theoretical solution has received some applications in the hands of Quinet, Lerebours, and other skilled photographers. Imagine a person placed opposite a camera, and that his negative image is copied in the focus of the lens on a plate or sheet of paper; it is one of the first principles of optics that rays of light, starting from the image formed in the focus, and retracing backwards on their path, would depict the original object; and therefore, by illuminating the image, and substituting for the sitter a sheet of sensitive paper, placed in obscurity, the rays emanating from the image would depict a portrait of the exact size of life: it is simply the property of conjugate foci. The difficulty, by this method of operating, is to sufficiently illuminate the image or negative placed in the conjugate focus of the lens: and there is also another serious inconvenience in thus enlarging the image, independent of the faintness of the light, and that is, that all the imperfections are magnified at the same time, so that the images thus obtained, the positives resulting from the enlarging of the negatives are imperfect, both as regards clearness and sharpness.

We might mention some other solutions, but we must come to that of Mr. Woodward, which has given rise to this article. Mr. Woodward is an American painter, and his invention addresses itself more especially to painters, his *confrères*, but not so as to prevent photographers from profiting largely by it. We have lately seen it at work in the gallery now directed by M. Henry Badié, pupil of MM. Soleil and Duboscq. M. Thompson, M. Duboscq, M. Henry Soleil, and M. Bingham, the incomparable photographer of oil paintings, assisted us at these improvised experiments with this new instrument, and, like ourselves, were perfectly satisfied. We say *improvised*, because the apparatus was not properly fixed and adjusted.

Mr. Woodward frankly says that he has not invented any new principles: his apparatus is really nothing more than a solar microscope or magic lantern; but we are not aware of either of these having been before made use of under the same conditions for the reproduction of large photographic images. A mirror, inclined at an angle of 45° and of a large surface, which may be fixed to a heliostat, if great precision be desired, receives the rays of the sun and reflects them parallel on to a large condensing lens. Inside a box, of which the lens occupies the front, and in the axis of the rays which the lens has rendered convergent, is placed vertically the small negative image on transparent paper or glass, which is to give the magnified positive. Almost in the focus of these converging rays, at the apex of the cone which they form, is an ordinary camera lens, simple or compound; and on regarding the surface of this lens, the extremely luminous focus, or point of the cone, will be observed. The rays which have traversed the negative image diverge again from this focus or point, and proceeding onwards, form an image which will be magnified in proportion to the distance of the screen, upon which is placed the sensitive paper.

This screen is placed inside a dark room, in which only the rays issuing from the lens are allowed to penetrate. The surface which receives the image is usually a sheet of paper prepared with chloride of silver, rendered sensitive in a bath of ammonia-nitrate, but Mr. Woodward has frequently operated on albumenised paper.

Stationed himself in the dark room, the photographer sees the positive printing before his eyes; he superintends and directs the action of the light; by the aid of screens he can suspend at his will the action of the light upon any part of the picture which seems to be getting too dark; and he can stop the action when he thinks it has obtained the desired intensity, and fix it by any of the ordinary processes.

Mr. Woodward has left at M. Badié's gallery a certain number of specimens of his beautiful work: two portraits of gentlemen, one of the size of life, and the other two-thirds the size, both superior to all that has hitherto been done of this kind; two landscapes taken on painters' canvas, which are very beautiful proofs; and a portrait of a little girl, whole-plate size, copied from a very small negative.

In general, the negative which is to serve as a point of departure for a positive ought to be rather faint, for all the details and half tints of the positive to be well preserved. Far from being an inconvenience, this requirement is a considerable advantage, because the negative may be taken in a very short time, and thus the time of setting may be much diminished; especially in the case of portraits of children, or reproductions of living animals, where a good dense negative is difficult to get.

It seems to us that the arrangement devised by Mr. Woodward will be very useful in the production of carbon prints by the methods of Poitevin, Pouncy, Salmon and Garnier, Lafon de Camarsac, &c.; it may be said to have appeared providentially to hasten this new and important step in photography, and we have, therefore, advised M. Disderi, who has resolved to put the last touches to the manipulations of M. Lafon de Camarsac, to carefully study this American apparatus.

We may remark, in conclusion, that a small print in carbon, representing the portrait of a young lady, which we sent to London, has much struck the English amateurs. Mr. Crookes, Editor of the "Photographic News," proclaims it irreproachable, and comparable to the best portraits printed by the silver process; he avows frankly that M. Lafon de Camarsac has far surpassed all the anticipation that the attempts of M. Pouncy had led him to form. What, then, will it be when M. Disderi shall have set his hand to the work with a full determination to conquer every difficulty?—*Cosmos.*

AUSTRALIAN NATURE—AND THE ART OF THE PHOTOGRAPHER.*

We begin to consider our present endeavour as something *novel*, viz., to sketch, in a short space, the features of a whole part of the world, in as far as designing art and photography are concerned. With the other parts of the globe, this would be a matter of compilation; with us it is autopsy, and the result of a sojourn in that—one of the *fairest* lands on the face of the earth. As the Andes have now found their depictor in the highest pitch of art, we trust that some spirited men of talent will also soon take up that future empress of the southern hemisphere. Australia has no sculptor like *Power* yet, as her elder sister of the western world; still, the art of the landscaper has already been somewhat exerted in its behalf. Leaving aside the *merely* geographical views of the older travellers, it is Westall, the painter of the Flinders-Brown Expedition, the landscapes of whom, included in the "Voyage," are of great merit. Twenty or thirty years ago, Mr. Glover, known at that time in the London exhibitions, settled in Van Diemen's Land; but we do not know whether the splendid sight of Table Mountain, impending, as it were, over the capital of Hobart Town, or the basaltic giant's colonnades of Cape Roul, &c., ever occupied his pencil. There have appeared of late some photographs of Australian scenery in London, but they are not of great value. Lithography, and even zincography, was introduced as early as the year 1834, in Sydney, and of the former some small but characteristic plates were then published. At that time, also, the first sheet of music was printed in Sydney.

But we have now to continue to point out those subjects which will interest the photographic artist. Although of comparatively recent origin, the Australian provinces can boast of some *historical* scenery, which deserves well to be represented in the highest scale of art. Apart from the landing places of *Abel van Tasman*, alluded to in the former article, it is James Cook and Joseph Banks who forcibly strike the imagination of every Englishman. On those precipitous sandstone rocks of the south shore of Botany-Bay, a modest brass tablet (erected by Governor Brisbane) points at the spot where the *Endeavour* first cast anchor in the Bay; outside heave the waves and rollers of the South Sea. Another most interesting scene is the little brook, somewhat farther west, near the banks of the Bay, the watering-place of Captain Cook, so well described in his Journal; and it was these identical shrubs and plants growing around, which Banks and Solander first examined, and which, by their novelty, astonished Europe, and gave Botany the appellation of a Bay. On the north shore of this inlet is the modest, yet interesting monument erected by the French Government on the spot where the unfortunate La Peyrouse and his expedition had stopped last, and was then never heard of no more. The Government House, Sydney, the first built in the country, the abode of some talented and worthy men, like General M'Quarry (called *old* M'Quarry), Thomas Brisbane, &c., deserves to be preserved for posterity. Here, therefore, we have arrived at the highest vocation of photography, viz., to preserve in life-true delineations sites, as they were when first trodden by the white man and civilisation—sites, the more important at a future period, when the destinies of these countries will have become more defined and developed. Antiquities, properly so speaking, the main land of New Holland has none, except the tracks and roads trodden out by the naked feet of the wandering native tribes, through the succession of centuries, even in the barren rocks. Some such, as they are met with, for instance, in the Australian Alps, ought also to be carefully preserved in large plates. We may state here, that such photographs ought to be taken soon, as the onward wave of civilisation and population will, ere long, roll over these localities, and cover them with their often unmeaning gloss. If, however, the Legislatures of the Five Confederated Provinces should each only vote a moderate sum, some *opus ære perennius* could be produced, as we shall detail hereafter.

Although there does not yet exist a general physical description of Australia (a work, after all, perhaps yet premature), still, valuable data have been laid down both in books as well as in periodicals. Botanical geography being one of the chief departments of such a description, claims first our attention. Robert Brown says, that one-fifth of the whole vegetation of Australia consists of *gum* (Eucalyptus), and he is right; but of this genus more than fifty species are already known, and each, so much varied in size, form, foliage, colour of bark, &c., impart to the scenery an especial character, and photographs of such scenery would be amongst the most striking, interesting, and instructive. There are gum trees in Australia upwards of a hundred feet high, of a gigantic stem, the bark of which is as if painted with some white varnish, the (perennial) leaves being of a lustrous colour. Some smaller, shrub-like species, widely diffused, have leaves quite *silvery*, and the traveller thinks that he is pacing through one of the gardens of Armida. What photography can do *now* (only thirty years after its invention), is to give us a most correct and life-like delineation and shading of the scenes subjected to its process. What will and can be yet done for the equally life-like colouring and tinting of such plates, their manifold reproduction, &c., lies also in the womb of futurity. But great occasions and great scopes will and must produce great

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* Continued from vol. ii. p. 233.

results! If we add to the Eucalyptus scenery that of the flower-meadows and shrubberies, the Acacia forests, before alluded to, all over the country; the palm groves of Morton Bay and Port Essington, the thickets of arborescent fern-trees (Alsophylla Australis), we may have stated enough for the present scope of the photographic artist and traveller. Mr. Church's picture of the Andes already indicates, what different aspects and characters will appertain to the landscapes of distant countries, if once seized by a perfected photography, and the Claude Lorraines and Poussins of a future time.

(*To be continued.*)

Critical Notices.

The Photographic Tourist. London: F. J. Cox.

The facts connected with photographic manipulations are few; and most writers who profess to treat of this or that process, describe it in a set form of words, very much resembling the style of a recipe in a cookery book; only, instead of beginning, "first catch your hare," it runs, "first clean your plate," the importance of which operation is enforced in such very emphatic language, as to fill the soul of the young photographer with affright. We admit that there is one advantage attending this concise, not to say abrupt, method of treating the subject, which is, that a young photographer may get the whole thing off by rote, and may go through the manipulations in a systematic manner, even if he can give no reason for the results produced.

In the book before us, the title of which is "The Photographic Tourist," we have a work of very comprehensive character. It commences with a description of the apparatus necessary for a tour, giving cuts of the various objects, beginning with the envelope, and going through the whole series, from the camera to the plate-holder, and describing the different photographic processes, from taking the picture to printing it.

Dictionary of Photography.

Fixing.—This term is applied in photography to the operation by means of which the picture is prevented from undergoing further change by the action of the light. This is effected either by pouring over the sensitive surface a substance which is capable of preventing any further change, such as solution of bromide of potassium, or by entirely dissolving away the unchanged sensitive substance by an appropriate solvent, such as ammonia or hyposulphite of soda. In practice, the latter salt is almost exclusively employed.

Fluorotype.—A name given, by Mr. Hunt, to a photographic process in which fluoride of silver, associated with bromide of silver, is the sensitive surface employed. The paper is first washed over with

Floride of sodium	5 grains,
Bromide of potassium	20 grains,
Water	2 ounces,

and when dry a 60 grain solution of nitrate of silver is brushed over it. The paper so prepared is said to keep for some weeks without injury, and requires but a short exposure in the camera. The development is effected by means of a dilute solution of protosulphate of iron, and the image, when fully brought out, is fixed with hyposulphite of soda in the usual manner. It was in experiments on this process, and its modifications, that Mr. Hunt obtained images in which the traces of natural colouration were distinguishable.

Fluorescence.—A remarkable phenomenon of light first observed by Sir J. Herschel and Sir D. Brewster, but not thoroughly investigated until Professor Stokes turned his attention to it, and, in an elaborate analysis of the whole subject, made the important discovery of the possibility of rendering visible to the eye the chemical rays of light. The experiments which were devised by this gentleman for the above purpose have taken their place as some of the most important scientific investigations; and as the plan which he originated is the one almost universally adopted in researches on the more refrangible rays of light, and is constantly spoken of and referred to by writers on physical optics, we are induced to append at length the discoverer's own account of the phenomena, as given in the report of a lecture which he delivered at the Royal Institution of Great Britain, and which has been placed at our disposal by the kindness of the Rev. J. Barlow, the honorary secretary of that Institution:—

"Before proceeding to the more immediate subject of the lecture, it was necessary to refer to certain discoveries of Sir John Herschel and Sir David Brewster, more especially as it was the discovery by the former of these philosophers of the epipolic dispersion of light, and of the peculiar analysis of light which accompanies the phenomenon, that led to the researches respecting the change of refrangibility.

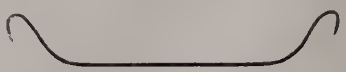
"When a weak acid solution of quinine is prepared, by dissolving, suppose, one part of the commercial disulphate in 200 parts of water acidulated with sulphuric acid, a fluid is obtained which appears colourless and transparent when viewed by transmitted light, but which exhibits, nevertheless, in certain aspects, a peculiar sky-blue colour. This colour, of course, had frequently been noticed; but it is to Sir John Herschel that we owe the first analysis of the phenomenon.[*] He found that the blue light emanates in all directions from a very thin stratum of fluid adjacent to the surface (whether it be the free surface or the surface of contact of the fluid with the containing glass vessel), by which the incident rays enter the fluid. His experiments clearly show that what here takes place is not a mere *subdivision* of light into a portion which is dispersed and a portion which passes on, but an actual *analysis.* For after the rays have once passed through the stratum from which the blue dispersed light comes, they are deprived of the power of producing the same effect; that is, they do not exhibit any blue stratum when they are incident a second time on a solution of quinine. To express the modification which the transmitted light had undergone, the further nature of which did not at the time appear, Sir John Herschel made use of the term 'epipolised.'

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—*(continued).*

In dishes intended for developing, or for washing away the superfluous nitrate of silver in preparing plates for a dry process, it is frequently desirable to have some means of resting the plate, face downwards, without injuring the film. As a means of effecting this, a small bridge may be formed of a strip of gutta percha to span the dish. Instead of having the usual arch of a bridge, the arch should be reversed so as to hang into the dish; the ends being supported on the edges by hooks formed at each end. A sectional view of the bridge would be something like the following figure:—



The curve at the bottom should be formed so that the edges only of the plate come in contact. This, when in use, should be placed over one end of the dish, so that the plate may rest with one end on it, and the other on the bottom of the other end of the dish. This bridge will be easily formed by softening a strip of gutta percha—say, half an inch broad and one-sixth of an inch thick—in hot water, and fitting it to the dish with which it is intended to be used, whilst it is soft. There will be no need of attaching it to the dish. Where a dish is intended to be kept expressly for the purpose of which we are speaking, permanent rests for the plate may easily be applied. Small pieces of gutta percha, one for each corner of the dish, should be prepared; if the dish be very slightly larger than the plate, pieces about a quarter of an inch square, or very little more, will be large enough. These should be slightly heated at the sides of contact by the flame of a spirit lamp, and the corners of the dish at the same time heated by a piece of hot iron, or thick wire. The pieces must then be put in the corners and held there until cool and firmly fixed. A dish for either developing or washing the plate with its face down, without injuring the film, is thus easily made. For removing plates from such dishes, a hook of silver wire is useful, or, what will answer the purpose quite as well, a hook of common wire coated with gutta percha. The best mode of covering wire with gutta percha, for this and other purposes, we shall in due course describe.

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[*] Philosophical Transactions for 1845, p. 143.

The photographic tourist will generally find it convenient to have his dishes "nested"—a set, one fitting within the other. If the method of making them on moulds be selected, this will be a somewhat troublesome operation, involving the necessity of a complete set of moulds. If the simpler plan of making the dishes we described in our last be adopted, the nesting becomes an equally simple process. The proportion smaller which each dish, intended to fit into another, must be made, will easily be ascertained by measurement or calculation. Thus the outside dimensions of the inner dish must always be a little less than the inside dimensions of the outer one; to secure this, proceed to cut out the set, say of three, at once from the sheet. The inside dimensions of the largest are to be, we will suppose, 7½ inches by 5½ inches, and three-quarters of an inch deep. The piece of gutta percha must, therefore, be nine inches by seven. If the sheet be, as we will suppose, one-sixth of an inch thick, the size of the next dish must be just twice that proportion, that is, just one-third of an inch shorter and narrower; as it would, probably, fit too tight, if merely the exact proportions were allowed, it would be better to allow half an inch, so that the piece for the second dish would be 8½ inches by 6½ inches, giving a dish, when the sides of three-quarters of an inch were turned up, of seven inches by five inside measurement. The size of the third piece would be 8 inches by 6 inches, giving a dish 6½ inches by 4½ inches inside measurement, and so on, for as many as may be required.

In our last we gave the proportions for a solution of gutta percha. As that was for a specific purpose, and solutions of gutta percha have been proposed for a variety of purposes in connection with photography, it may be important to say a few words more on the subject. Gutta percha is, as we have before stated, soluble in bisulphide of carbon and in chloroform without heat; and in benzol, camphine, turpentine, and mineral naphtha with heat. Of these solvents, chloroform or benzol should be chosen as least liable to any photographic objection. Common mineral naphtha possesses some property, apparently of a greasy nature, which prevents a solution of gutta percha prepared with it from adhering properly to anything; the same is true, we believe, of turpentine.

A solution of gutta percha has been proposed as a preservative varnish for positives on both glass and paper. For a purpose of this kind, about 30 grains of gutta percha to an ounce of solvent would be quite sufficient to form a good protective film. If benzol be used as the solvent for such a varnish, it must be remembered that, unlike other benzol varnishes, it will require the aid of heat to prevent it chilling in drying, and it is even then apt to become slightly opaque, if at any time the film is subjected to a low temperature. This opacity, should it occur, may be removed by the application of heat. The risk of opacity may be avoided, however, by using chloroform instead of benzol as a solvent, in which case all chance of chilling is avoided.

A film of gutta percha to support the film of collodion has also been proposed as a substitute for glass. We believe two methods of using the solution for this purpose were patented by the late Mr. Scott Archer shortly before his death. One method was to pour the gutta percha solution on the glass plate, and when it was set, coat with collodion and manipulate as usual, removing the film of gutta percha and collodion together when the picture was complete. In the other method the picture was taken and completed in the usual way, and when dry coated with the gutta percha solution; the two films were subsequently separated from the plate prior to removal by immersing it in water. Whether either of these methods have been prosecuted with success, we cannot say. In regard to the first, there is some difficulty in preventing both films leaving the plate together whilst in the nitrate bath. The second method we have not tried with a negative, but have used it successfully as a means of transferring a positive from glass to leather or cloth. For this purpose about 30 grains of gutta percha to the ounce of solvent would be sufficient; and chloroform would be preferable for the purpose to benzol. As a matter of economy, methylated chloroform would answer the purpose quite as well as pure.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 25th July, 1859.

My friend, M. Jobard, in his large work, *Les Nouvelles Inventions aux Expositions Universelles*, which I criticised rather severely the other day, thus speaks of M. Nièpce de St. Victor's curious discovery on the "New Action of Light": "A body having been exposed to the rays of the sun, does it retain, when placed in the dark, any properties of this insolation? That is what remains to be seen, said to himself the nephew of the inventor of the Nièpceotype, and he immediately exposed to the sun an engraving that had been kept for a long time in darkness; the engraving was then placed upon a sensibilised photographic paper. The result was that the white portions produced their effect, and that a reversed image of the engraving was printed on the paper, by means of which, as a negative, copies of the engraving might be produced *ad infinitum*.

"This process, which requires neither talent nor tools, will be found extremely useful by those poor devils who, having no profession of their own or sinecure under government, are reduced to the hard necessity of fraudulently imitating bank-notes. Happily the government of Great Britain has just authorised an indefinite multiplication of notes by the Bank of England, by granting it an indemnity bill.

"One hopes that this augmentation of riches will put a prompt end to the present crisis.

"The discovery of M. Nièpce de St. Victor could not have happened more *apropos*.

"The Bank of France, which is less generous, has asked the Bank of England, we are told, to inform it of a method of preventing the 'solar re-printing' of its paper. In our opinion, the poor lieutenant (M. Nièpce) has a right to a large sum of money for having thus inaugurated the era of the association of talent and capital."

I must now call attention to a letter inserted in the last number of the *Photographic Journal* by a Mr. C. J. Burnett. In this letter, Mr. Burnett claims to be the discoverer of Nièpce's "new action of light," or, at least, of some of the details of that discovery. If Mr. Burnett will forward to me any papers, data, &c., or furnish me with any means of judging of these claims, I shall be happy to make his right to the discovery known both in France and in England. As to the extraordinary letter Mr. Burnett has inserted in the *Photographic Journal*, I am surprised that he should have written it, and that the *Photographic Journal* should have had the bad taste to insert it.

M. Nièpce has been making some very curious experiments on the chemical changes undergone by starch, and other organic substances, under the influence of light. We all hope that he will not keep us long waiting for his first paper on this new subject. It appears that starch, for instance, suspended in water, with a slight quantity of any metallic salt, and exposed to the rays of the sun for a certain time, is converted, first into dextrine, then into grape-sugar. M. Nièpce believes that he has produced cane-sugar in this manner. If this result be confirmed, it will constitute one of the most important discoveries of this century. The experiments were made in glass flasks, and the substances obtained were recognised, not only with the ordinary chemical re-agents, but also by their optical properties in the polariscope. By the nature of the deviation of a ray of polarised light, M. Nièpce assured himself, that when the starch or dextrine disappeared, it gave rise to grape-sugar or cane-sugar. It would appear also, that in these new investigations the organic substance is transformed in presence of a metallic salt, and under the influence of solar light, into some entirely new substances, that present none of the chemical re-actions manifested by starch, dextrine, sugar, &c. Finally, we may add, though with a certain reserve, that grape-sugar may be transformed, by the action of light alone, into oxalic acid.

The above facts I communicate to you from verbal communications, M. Nièpce having published nothing yet concerning them.

I do not feel convinced that all the effects observed are to be attributed to light alone; chemical affinity determining fermentation and electricity, may perhaps have an equal part with light in the production of these phenomena.

The experiments are being continued in M. Nièpce's laboratory, at the Louvre.

The *Cosmos* gives this week a long article on "Positives, natural size," in which some enormous proofs, obtained by Mr. Woodward, an American photographer, are spoken of in a flattering manner. The writer thinks that these large proofs may become useful to painters, portrait painters, landscape painters, *peintres de genre*, &c., by allowing them to dispense with a knowledge of drawing. I am not, however, of this opinion. I believe that photography will never be useful *in that manner* to artists. The way in which photography has, to my knowledge, proved most useful to artists up to the present time is, by the 'reproduction' of pictures.

The Société Hollandaise des Sciences, of Haarlem, has just held its 107th annual meeting. Five memoirs in French and Italian were received by the society in answer to prize questions proposed for this year. None of them were considered worthy of the prize (a gold medal of 150 florins), or important enough to be inserted in the memoirs of the society. The latter publishes a long list of questions proposed for 1860 and 1861. These, together with the conditions of the competition, may be had on application to the secretary of the society, M. Van Breda.

M. Pasteur has been making numerous observations on alcoholic fermentation. From time to time he communicates the results he arrives at to the Paris Academy of Sciences. These results have become already extremely interesting. M. Pasteur still insists on regarding alcoholic fermentation as essentially due to the vegetation of a minute cryptogamic plant, "the ferment," or the "yeast plant." This view was put forth many years ago by M. Cagniard de Latour, whom the hand of death has so lately taken away from us, and has been contested as insufficient to explain the phenomena observed by more than one eminent chemist. According to Lavoisier and Gay-Lussac, when sugar ferments it is changed into alcohol and carbonic acid, —100 parts of sugar, according to their theory, was decomposed by the mysterious influence of the "yeast plant" into 51·34 parts of alcohol and 48·66 of carbonic acid. The alcohol remains in the solution—the carbonic acid goes off in the gaseous state.

According to M. Pasteur, the theory is not quite so simple; other substances are formed besides carbonic acid and alcohol, among which the most unexpected are glycerine and succinic acid. The former of these substances forms part of fatty matters, the latter is generally derived from amber (succinum), though it has of late years been produced in a variety of ways, such as the fermentation of malate of lime by means of cheese, &c., and has been found in plants of our climate.

In *resumé*, then, out of 100 parts of pure sugar submitted to fermentation, from 5 to 6 parts do not decompose into alcohol and carbonic acid, but are converted into succinic acid, glycerine, and a few other products which have not yet been examined.

But what is still more striking, wine, as we all know, is formed by the alcoholic fermentation of the sugar contained in the juice of the grape. M. Pasteur naturally supposed, therefore, that wine would also contain glycerine and succinic acid. He evaporated a litre of wine (about a pint) and obtained a residue weighing from 15 to 25 grammes (according to the species of wine employed), from which a considerable quantity of glycerine and succinic acid were obtained. I doubt if these substances were ever before recognised in any description of wine. M. Pasteur found that a litre of wine contained from 5 to 8 grammes of glycerine, and from 1 gramme to 1·5 grammes of succinic acid.

Dr. Phipson has made known an easy method of analysing phosphates of lime, such as the "superphosphates" employed in agriculture, &c., and of effecting the quantitative separation of the lime and the phosphoric acid. The latter is thus effected:—The phosphate of lime having been dissolved in hydrochloric acid, an excess of acetate of soda is added to the solution. In this manner the whole of the free hydrochloric acid is transformed into chloride of sodium, and is replaced by a corresponding quantity of acetic acid. Now, as oxalate of lime is not soluble in this free acetic acid, the whole of the lime may be precipitated by oxalate of ammonia. The precipitate is washed, dried, and calcined. It is weighed as carbonate of lime, or as quick-lime, according to the heat employed in the calcination. The phosphoric acid in the filtrate is determined in the ordinary manner, as phosphate of ammonia and magnesia.

M. le Baron Cagniard de Latour, member of the French Institute, has gone from among us. He died at the age of eighty-two.

This eminent *savant* was born at Paris in 1777. His first studies were made at the Ecole Militaire of Rebais and at the Ecole Polytechnique. We owe to him many curious and useful discoveries. The first was that of lucifer matches, which has given rise to a branch of industry that has spread over the whole globe. He proved exceedingly useful to the French Government in 1814, by the invention of a new machine for the manufacture of gunpowder. He was the first to show the exact nature of the "ferment" or the "yeast plant." In studying the action of aqueous vapour at a high pressure on wood he produced a sort of artificial coal, and it is believed by some that he once succeeded in the artificial formation of the diamond. For the rest he has given us a great number of scientific memoirs on physics, especially on acoustics—a branch of knowledge for which he had a great predilection. In 1819 M. Cagniard de Latour invented his *Sirène*, a small but extremely ingenious instrument for determining the exact number of vibrations of which any given sound is composed.

M. Bécquerel pronounced a most flattering discourse over the tomb of this once eminent and laborious philosopher.

A PHOTOGRAPHIC TRIP UP THE WYE.

To the Editor of "The Photographic News."

Sir,—I would not advise any of our *confrères* who may visit the Wye to trust themselves with their camera in a very curious kind of boat which they will see in use there. These boats, or coracles, or truckles, as some of the people seem to call them, are made of canvas, either tarred or painted, but I think tarred, and stretched tightly over wicker-work. They are used by the fishermen and cost very little, and though they are easily damaged, if the bottom comes in contact with a piece of rock, they are just as easily mended. They furnish another instance that the progress of modern times is not always able to improve on an ancient invention, even when, as in this case, the invention is as old as the Druids. I am better able to advise photographers on the subject of using these coracles, as I myself have had practical experience of the dangers attending their use. I wanted to take a picture or two of a spot we had passed on the previous evening, and as it seemed unnecessary trouble to go back with the boat, I put my camera and a box with half-a-dozen plates prepared by the Fothergill process into a coracle and paddled down to the spot selected. I reached it without misadventure, got my negatives, and was leisurely paddling back, when I suddenly caught sight of a piece of rock in the stream just ahead of my cockleshell. I made a hasty movement to avoid it, and succeeded; but in avoiding Scylla I tumbled into Charybdis; the fragile vessel turned over and took in a quantity of water, and it was more a chance, I believe, than anything else, that I saved it from going over altogether and spilling me in the bargain. As it was, I only lost the result of my labours, for the plate box being in the bottom of the coracle, got filled with water. Luckily my camera escaped, because having been told that I should probably make a hole in the bottom of my conveyance, I passed the tripod through the handle and placed it across the machine, so that the camera was suspended, and consequently escaped a wetting.

The river, from Monmouth upwards, offers many charming scenes for the photographer, who may multiply the number of his negatives to almost any extent he pleases. By the time I reached New Weir I had added fourteen to those I had up to the time of my leaving Monmouth. The scenery along this part of the river may well be termed grand. Great fragments of the cliff jut out in all kinds of fantastic shapes, and lie at the foot in great rough pieces. The cliffs are very steep, and every now and then you see the gaping mouth of a cavern, into which the light penetrates to so slight an extent as to make it very difficult to get a good negative of the spot in which it occurs. There are lots of legends attached to these caves in which King Arthur and his knights figure, and how there was once a man who entered the cave in which this king and his knights were enchanted, and was rewarded for his boldness with a bagfull of gold—and how the spirit who guarded this cavern raised a barrier which has always since that time prevented inquisitive mortals who have tried to find the entrance from succeeding. Some parts of the river are so thickly overhung by trees as to make it difficult to get a picture, and I have had to expose on some occasions as much as twenty minutes when working with the dry process, though this process was Fothergill's, which I consider to be by far the most sensitive of all the dry processes.

On reaching the New Weir, we left the boat and spent a couple of days in making excursions in the neighbourhood—a proceeding I would recommend to any photographer who may decide on following the same route. There are many very pretty scenes in the neighbourhood, and one on the spot which I took, but forgot to mention, and that is the "Fall," which is really a very pretty picture. At least, two very good negatives may be got of "Symond's Yat," a hill, probably about a thousand feet high; and even if one does not feel disposed to take a picture, it is worth while walking up it for the sake of the view it commands: on one hand the Forest of Dean extends for a long distance, the dense and varied green of the foliage, marked here and there by the spire of a village church, and the light blue smoke curling upwards from a village which is hidden from the eye, adding to the beauty of the scene, and breaking what might otherwise seem the monotonous succession of trees which pass under the eye before it reaches the beautiful country beyond, and which they tell me comprises a portion of three counties. Following the windings of the Wye, the eye encounters scenery of the loveliest description, dotted here and there by objects which add to its interest. One of these objects which attracts attention most strongly is Goodrich Castle, about a mile distant in reality, but supposing the eye to have followed the river, it has passed over a distance of six, or, as some say, seven miles. The view in this direction is bounded by the Welsh mountains, and this, perhaps, is the view which will most delight the photographer, especially if he be a London photographer, whose business confines him to that city during a great part of the year. After I had spent all the time I had to spare in admiring the various views that are offered from this hill, we descended and took our way across the meadows to Goodrich Castle.

The castle is a fine ruin; I think the finest I ever saw. It must have been a splendid pile before it was dismantled; even now one can see that it possessed all the appurtenances of the old feudal castles, and was duly defended by barbicans, ballium, and other outworks, which must have made it a place of great strength. When it was erected I am not aware, but there is no doubt as to its great age, nor any as to the solidity of the walls. Besides one large negative of the general appearance of the ruins, I took three stereoscopic pictures, and, but for an unfortunate piece of forgetfulness, which I greatly regret, I should have taken some others: this forgetfulness had reference to the plates. On taking out the plates I had used from the box, on the previous evening, I forgot to replace them by others, and had started under the impression that the box was filled as usual. I have additional reason for regretting this, as it prevented me from taking negatives of a place which is even more beautiful as a picture than that just referred to—I mean Goodrich Court, a building which is in the exact style of a castle of six centuries ago. Its bartizans and tall conical spires, and battlemented turrets, give it a most picturesque appearance when regarded at a short distance, so as to bring the detached flag tower and other buildings into the view. Its position being on a promontory overhanging the river, not only renders it visible at a great distance, but gives it very much of the appearance we notice in some of the castles on the Rhine. To approach the Court you have to cross a drawbridge, and go through a gate defended by a portcullis and round towers. The inside of the building, at least of that part which is not entirely devoted to domestic arrangements, is quite in the style of the old feudal castle. Most of your readers are, doubtless, aware that Goodrich Court is famed for its collection of ancient armour, made by the late Sir Samuel Meyrick, who likewise built the Court; and with great thoughtfulness for the comfort of travellers, for which I, as a wandering photographer, feel grateful, a very nice little inn in the adjacent village, which he named "The Hostelrie," which was to be an exact imitation of an old-fashioned English hostel. There is one point, however, in which this as well as other inns near the Wye differ from the inns of old, and this is in the matter of prices. I don't mean to say they are exorbitant, but I think they might be reduced with advantage to the innkeepers, and certainly with advantage to the photographer.

From the Court we went, after a short rest, to Ross by a path alongside the river, which, though the longest way, I would recommend any of your readers to follow it, as it offers scenes far superior in beauty to the shorter route which you may reach by means of the ferry. The difficulty I experienced here was not in finding good views, for there was hardly a yard which did not offer a temptation to fix the camera. Unfortunately, I was unable to gratify my desire in this respect from the accident I have mentioned. The river here is broad, and winds along in the most picturesque manner. On the left bank are meadows, which present a beautiful contrast to the lofty hill on the opposite bank, on which Goodrich Court is built, and the sides of which are covered with trees. I think I never in my life saw a view which would make a better photograph, especially if one could use the plano-panoramic camera of Garella, respecting which so much was said in Paris some two or three years ago, and which I presume succeeded no better than one which I made myself at considerable cost, and what was worse, loss of time. I don't wish you to understand that I invented the plan of this camera; I simply followed the description given in the Bulletin of the French Photographic Society, and so, I think, made certain improvements in it, but without getting it to work well. Still, I think something may be done in this direction, and as soon as the weather ceases to be favourable to out-door operations, I shall resume my experiments. To return to my trip. The extreme beauty of the scenery made me regret so much my forgetfulness of the morning, that the pleasure I should otherwise have felt in my walk was considerably diminished, and I reached Ross in a rather discontented mood. Associated with Ross is an individual whose photograph would be viewed with interest wherever our language is read: I need scarcely say I allude to the "Man of Ross." There is hardly an object in the town which is thought worth looking at which is not associated with him in some way or other. In the church, no very striking object in itself, it is the pew in which he sat, his monument with an inscription and his bust; the spire of the church itself, if we may believe the poem, being a more conspicuous monument to his memory than that which bears the inscription. The terrace outside the church, called "the Prospect," was made by him also, and deserves the name much better than the majority of places that bear a similar denomination, for the view from it is both extensive and beautiful. Of his house I took a negative the following morning before leaving, the man having brought my plates up the previous evening. The inhabitants of the place seem thoroughly proud of the man whose good deeds have been immortalised by Pope, and whose reputation has conferred a similar immortality on the place in which he spent his meritorious life.

On leaving Ross, and continuing his way along the river, the photographer will find nothing to induce him to unpack his apparatus for some seven or eight miles; but after we had passed this distance, we came upon a succession of views, which speedily absorbed my stock of plates. Pretty little islets occurred here and there, and a sufficiently shallow spot was soon found in the bed of the river, on which to pitch the camera. There is no comparison in point of beauty, in my opinion, between my negatives taken in this position, with the river flowing along on each side of it, and one taken from the bank, such as I have frequently seen; more especially is this greater beauty observable in the case of the stereoscopic picture which I sent you, with that referred to in my last communication. Besides these views, there are others of a different character. Every now and then, there occurs a break in the trees which line the bank, and you get a lovely view of the hills beyond. So delightful is this part, that you regret your arrival at the end of your day's journey. There is a rough-looking hill, which was pointed out to us by the boatman, which rises quite close to the spot where the river Lug joins the Wye, respecting which Camden says: "Near the confluence of the Lug and the Wye, a hill, which they call Marclay Hill, did, in the year 1575, rouse itself out of sleep, and for three days together, showing its prodigious body with a horrible roaring noise, and overturning everything in its way, raised itself (to the great astonishment of the beholders) to a higher place." Unfortunately, the appearance of this hill was not sufficiently attractive to tempt me to bring away a likeness of it, notwithstanding the strange fact recorded respecting it. The old city of Hereford contains objects which may form interesting pictures on some future occasion; but my stock of negatives had accumulated so largely by the time I reached there, that I only took two of the Cathedral and one of the Town-hall, which exhausted my stock of plates. The remainder of my trip, which did not end at Hereford, I made as a pedestrian, leaving my camera and et ceteras behind me; and though it might be interesting to photographers to know what objects offered themselves for the camera during the rest of my journey, I am warned by the length of my letter not to trespass farther on your space. I should like, however, before concluding, to add a word on the subject of a collodion, the formula for which was published in the "PHOTOGRAPHIC NEWS" a few months back. The formula I allude to is that of M. Mayall, and being, of course, aware of his reputation as a photographer, I thought a collodion recommended by him in such strong terms, must necessarily be a good one, and at the expense of some inconvenience as well as loss of time, I prepared some, not a large quantity, but sufficient to test its qualities. The result, I am sorry to say, did not answer my expectations; there was a want of vigour and cleanliness in the details of the picture, so that, after failing with half-a-dozen, I threw the remainder of it away. It is possible I may not have prepared the collodion as well as M. Mayall himself would have done it; indeed, my private opinion is, that it is a mistake for amateurs to attempt to make collodion at all, and I merely mention this fact in the hope that it may induce some others who have tried it to publish the result, as I cannot but think, in spite of my own failure, that it *must* be good, or a photographer of M. Mayall's reputation would not have recommended it.—Yours obediently,

R. A. W.

Miscellaneous.

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LATEST FOREIGN ART AND SCIENCE INTELLIGENCE.

Indian Photographs.—The brothers Schlagintweit, whose researches in India have been assisted both by the East India Company and the Prussian Government, have been especially successful in galvano-plastic and photographic representations of Indian subjects. Impressions of their photographs will be published in a short time by M. Brockhaus, of Leipsig.

Copenhagen—New Observatory.—Instead of the badly situated old observatory, a new one on the *ramparts* is to be built. It will, however, not be higher than 30 or 40 feet. Professor d'Arrest, its projector, has ordered the instruments from Messrs. Pistor and Merz, at Berlin and Munich respectively.

Humboldt's Epitaph.—A German contemporary prints the following epitaph for the great defunct:—

"After he had *all* seized and known, what moves in light *here*,
He now descended to *darkness* as well, for further research."

[This almost literal translation of the *distichon* may convince the reader, that it is difficult to write even an epitaph for a man like the great sage of Berlin.]

Restorations and Frescoes in Germany.—The Cologne painter, M. Welter, has completed the ornamentation of the ancient church of St. Cunigond, in Cologne. He has been now called by the Grand Duke of Saxe-Weimar to Eisenach, for the sake of completely ornamenting the restored castle, called the Wartburg, once the abode of Luther. The work will be entirely according to the designs of M. Welter, and will occupy him two years. The great banquet-hall is nearly completed.

Paris Art Exhibition.—Amongst the prizes awarded this year, M. Keller, of Düsseldorff, has received one of the first class, for his engraving of the *Disputa.* It is a gold medal of more than two inches in diameter, of the weight of one pound, and of the value of 60 sovereigns. Its inscription is characteristic:—"Empire Français, Maison de l'Empereur," &c. On the reverse is a basso-relievo, representing an allegory of the art of the engraver, with the inscription "Recompenses imperiales."

Berlin Geological Society.—At the late meeting, M. Schöchting exhibited some crystals, which were broken by a natural process, and again united by quartz. M. Schöchting further spoke of the existence of fluid and gaseous contents in the interior of crystals (especially quartz crystals), and asserted his belief that in this instance, as well as in granite, he could only recognise plutonic formations. It is known, that Sir Humphrey Davy and Berzelius ascribed to these mineral substances a volcanic (igneous) origin.

Effect of Lightning on Electric Telegraphs.—During the storm of the 8th inst., the telegraphic station of Basle was twice struck by lightning. The explosion resembled the discharge of a pistol, and the flashes passed above the apparatus. On the conductor (*Blitzplatte*), several brass wires were melted, the multiplicator of a *boussole* melted and burnt, smoke issued from the conductor, &c.

Life Recondite—The Wonders of the Microscope.—We copy the following extract from a paper entitled "The First Ages of the World," written by M. Alfred Maury, of the French Institute:—"The microscope has revealed to us infinite numbers of plants and animals, in countries apparently the least favourable to such a development. Near the two poles, where higher organisms could not exist, reigns a life invisible to the naked eye, and which hides itself under the thick cover of the frost. In the remnants of melted ice, which float in the form of rounded blocks near the Arctic circle, more than fifty species of *Silicious Polygastrics*, and the *Coscinadiscs*, have been discovered, the green covering of which show that they have successfully striven against the rigour of a frozen climate. Not only is the ocean tinted in places with colours which it owes to innumerable shells, or to prodigious hosts of plants spread through its waves; but even in places where it seems quite transparent, it is yet filled with all sorts of animal life. The lead has found, even at the depth of 500 metres, animals of the smallest dimensions. The waters of morasses and bogs conceal, as well as the ocean, astounding numbers of molluscs and worms of the most bizarre form; and in the interior of the earth, in those mines which but the blast of gunpowder will open, as well as on the highest points of the Alps and Andes, in thermal springs, and in the snow, cryptogamic plants and infusoria abound. The celebrated physiologist Nordmann, has found that the humors in the eyes of fishes are often filled with a species of worms armed with suckers; and that in the gills of the bait (*able*) there exists an animalcule with two heads and two tails. All the molecules which live on the surface of the earth, have, since the apparition of organic life on the globe, passed a thousand times through some higher organisms, which had appropriated them to their use. And these operations, which pass every day under our eyes, have now lasted for myriads of years."

Photographic Notes and Queries.

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DEFECTS IN FOTHERGILL'S PROCESS.

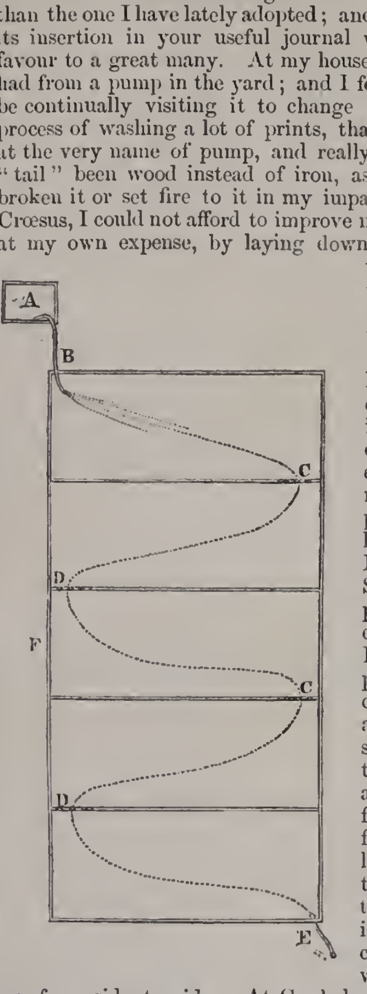
Sir,—In a recent contemporary appeared a letter from "W. C. J.," complaining, under the above head, of a certain evil, for which, as yet, no adequate remedy has been suggested. I am myself (in common, I doubt not, with a legion of Fothergillians) annoyed by precisely the same appearances, and, like "W. C. J.," find them the only bar to complete success. "W. C. J." describes them exactly:—

"It is the occurrence, chiefly in the skies, but occasionally in the other parts of the picture, of *striæ*, of all shapes and forms, sometimes very like (on a minute scale) what are called in silks and other fabrics '*water markings*;' at others patches of varying length and breadth, either ending abruptly, or shading off gradually into the proper shade of the film."

It is these zig-zag "water markings" that constitute my own difficulty, and I have, as yet, tried in vain to get rid of them. It is something, however, to have reached a negative knowledge on the subject, and in default of knowing what the evil *is*, to know what it is *not*. It is *not* "owing to the albumen not being evenly applied on the collodion surface," as the editor of the periodical alluded to suggests, nor from "particles of dust, by being put to dry on a dirty shelf." (Poor "W. C. J.," this was "throwing dust in his eyes" with a vengeance!) Again, referring to attempted explanations in the current number of the Journal, it does *not* "occur in the drying of the plates." I have placed scores of plates "vertically" (as if any one would put them horizontally!), with every precaution against impure contact. It is *not*, as Mr. Keene desperately suggests, owing "to the developer not being kept in motion," for the simple and sufficient reason that the stains are on the plate *before the picture is taken*, as is evident on examination of the plate by sufficient light after drying.

That it forms at the time of the contact of the albumen, I have proved beyond a doubt, and that it varies in proportion to the strength of the bath solution on the plate. If I wash in 4 or 6 ounces, and sacrifice sensitiveness, I get rid of it entirely; and on the other hand, by the 4-drachm process, I find it impossible to avoid it. I have tried every conceivable modification of dipping, draining, and drying—every degree of dilution of the albumen, and every imaginable method of pouring it on—baths, acid and neutral—collodions, contractile and non-contractile. I have worked at every degree of temperature, and, in fact, have done everything (except writing to Mr. Hardwich) that I can think of, and all without avail. This skeleton still haunts my dark closet. Can anyone whose eye may fall on these lines, remove it? G. M.

WASHING POSITIVE PRINTS.



Sir,—The effectual washing of positive prints, in the absence of a running stream near at hand, or a good supply of water indoors, has puzzled many tyros, and I daresay professionals too. Your correspondents have, at various times, suggested different plans that are simple enough; but I do not remember seeing one that is easier to accomplish than the one I have lately adopted; and, with your approval, its insertion in your useful journal would doubtless be a favour to a great many. At my house, water is only to be had from a pump in the yard; and I found it such a bore to be continually visiting it to change the water during the process of washing a lot of prints, that I became disgusted at the very name of pump, and really believe that, had its "tail" been wood instead of iron, as it is, I should have broken it or set fire to it in my impatience. Not being a Crœsus, I could not afford to improve my landlord's property at my own expense, by laying down pipes and taps, and therefore began to invent; and, simple as the plan is, I think I must have scratched a "tarnation" lot of hair off my cranium ere my ideas ripened into success. I know one or two newspaper editors who find great relief from a similar process during the labour of thinking. Now for my dodge: Suppose A to be my pump trough, and the escape hole corked up. I fill it with water by pumping; and as it cannot escape, I have a reservoir, with solid stone wall, holding thirty gallons or thereabouts. F is a box four feet long by two feet wide, made of half-inch deal, water-tight at the sides, and three inches deep, and is divided into five compartments, by wood partitions passing from side to side. At C a hole is bored through the *bottom* of the first partition to allow the water to run into the next one, where it escapes at D over a groove into the next, then under again at C into the fourth, and over at D into the fifth. At the corner E a pipe is inserted through the bottom of the box, and carries the water to a sink in the yard. In each partition I put as many prints as is convenient, and then connect the box at B with the trough A by means of a syphon of gutta percha. I stop up with a cork the pipe E until the compartments are full of water, then pull it out, and behold I have a running stream, in the direction of the dotted lines, that lasts for two or three hours, when I pump the trough full again for a fresh supply. I find it useful to have a lid to the box to keep out the continual shower of soot that falls in my neighbourhood from the factory chimneys. Hence all my prints are free from that vile contamination, which the Smoke Preventive Act has not, and, I believe, cannot lessen. The whole cost of the box, syphon, and escape pipe, was four shillings; the water costs nothing, which is cheap enough for the shallow-est purse.—Wishing every fellow photographer that dabbles in water, or plays tricks with sunbeams, a successful career, I beg leave to subscribe myself, PETER POSITIVE.

Newcastle.

GUTTA PERCHA DIPPERS.

SIR,—Your correspondent "S. E. C." stated in your last number (page 240) that a gutta percha dipper had been employed which had a piece of iron inserted to strengthen it, and, the gutta percha having a crack in it, the bath was destroyed.

About two months ago, I had observed a bright metallic deposit just above the shank of a gutta percha dipper which I was using, and I was disposed at the time to attribute this to some electrical action which had been set up in some way or other. On the following morning I found the deposit to have occurred in a much greater degree; in fact, there was a firm metallic incrustation around the shank of the dipper, which much resembled the deposit which takes place at the end of the negative pole of a battery in the electrotyping process; and a beautiful deposit of silver, in ramifications, like the branches of a tree, were observable to the extent of about an inch beyond the crystalline mass. On removing, with a penknife, the incrustation which had formed, I discovered something hard, which the knife could not remove; and this turned out to be, as your correspondent remarked, a piece of iron imbedded between the shank and blade of the dipper.

After I had removed the silver—which weighed about a pennyweight, at least—I heated a bar of iron, and, by passing it up and down the fissure from which the iron protruded, no further mischief occurred. I have no doubt that had I allowed the dipper to remain in the bath for a week, the whole bath would have been destroyed by the deposition of silver in the manner stated.

I may mention, also, that there was a good deal of silver deposited in a granular form at the bottom of the bath, which had doubtless fallen from the shank of the dipper.

I would strongly recommend your readers at once to look to their gutta percha dippers, and if there is any evidence of a metallic deposit thereon, to ascertain where the fracture is, and to stop it in the way I have mentioned.

ALEXANDER WATT.

METHOD OF INTENSIFYING NEGATIVES.

SIR,—I have great pleasure in forwarding you particulars of the stereogram I sent you last week. The process of strengthening the positive is a modification of the plan given by Mr. Hardwich, in his "Manual of Photographic Chemistry." I find it very useful for portraits, or anything liable to move.

First.—Make a saturated solution of bichloride of mercury in hydrochloric acid (or 2 ounces of bichloride in 7 drachms of the acid), to this add 18 ounces of distilled water.

Second.—Dissolve 12 or 14 grains of iodide of ammonium in 1 pint of distilled water.

Third.—1 pint of distilled water to 2 ounces of hydrosulphate of ammonia. These solutions should be kept in stoppered bottles.

The positive may be very slightly over-exposed, developed, and fixed in the usual way, and when thoroughly dry, run a strip of varnish round the edges to prevent the film peeling off. Then proceed as follows: first, moisten the surface with a little water, then pour sufficient of the solution No. 1 on the plate to cover it; let it remain a few seconds, keeping it in motion to prevent stains; wash well. Apply No. 2; wash; then No. 3, wash again; if not sufficiently intense, repeat the operation a second or third time, when a dense black will be the result, and it will bear printing in the strongest sunshine. J. S. OVERTON.

PHOTOGRAPHIC PRINTING UPON IVORY.

SIR,—Can any of your correspondents be kind enough to inform me of the best method of printing photographs on ivory? If done simply as paper, the chemicals sink, and the grain becomes very apparent; and if the ivory be albumenised, the ivory surface (so desirable for colouring) is lost.

W. R. R.

ANSWERS TO MINOR QUERIES.

NITRITE OF SILVER IN THE SILVER BATH.—*E. Bray.* The effect you describe, viz., the positive pictures taken with it exhibiting a total absence of half-tone, with intense solarisation of the whites, and irregular blue patches all over the plate, while the sensitiveness of the plate is materially increased, is due to the presence of nitrite of silver in the silver bath. It may be removed by rather strongly acidifying with pure nitric acid, and gently heating. After the solution is quite cool, add solution of pure carbonate of soda until there is a precipitate which will not dissolve on agitation, filter off, and then faintly acidify with acetic or nitric acid, as preferred. The presence of nitrous acid in a suspected bath may be readily ascertained by adding an excess of pure chloride of sodium to a portion of the bath; filtering off, and to the clear filtrate, adding a mixture of very dilute hydrochloric acid, with a weak solution of iodide of potassium and starch bath. In the event of its containing *nitrite*, a blue colour or precipitate will appear, according to the amount of this impurity that may be present.

TO CORRESPONDENTS.

E. S. MORO.—A rigid camera, with a sliding body, will be the best suited for the purposes you require. The size must depend upon the kind of lens used, and the size of the picture to be taken.

SALOP.—1. There is nothing in the description of your process which could possibly account for the enormous time of 1¾ minutes being required to take a negative portrait, when a positive can be taken in from 3 to 4 seconds. 2. You will find the process recommended by "O" in an early number of the present volume, more successful than the alkaline toning process you at present employ.

J. G. M.—Received with thanks.

A HATER OF SPOTS.—Add 10 drops of glacial acetic acid to each ounce of silver bath (positive paper), and we think you will no more be annoyed with spots.

AMATEUR.—We know of no such process.

CAPTAIN S. S. B.—We are unable to answer your queries on blistering, but will insert the letter in our "Notes and Queries," in the hope that the subject may be taken up by some one who has had more experience in the cause and remedy for this annoyance. We shall be very pleased to receive a further account of your experiments on the different intensities of the light in England and the Isle of Man.

A. ORSAY.—Chloride of platinum is prepared by evaporating to dryness, at a gentle heat, the solution of platinum in nitrohydrochloric acid. Perchloride of iron is prepared by dissolving pure metallic iron in nitrohydrochloric acid, and evaporating to dryness likewise at a gentle heat. Chloride of silver may be reduced to the metallic state by several processes. The details have already appeared in our columns.

A TOURIST IN HEREFORDSHIRE.—1. If you boil the hard water briskly for ten minutes, most of the lime will be precipitated, and may be separated by filtration. 2. We will give a description of such a process in an early number: glycerine will not do. 3. Try the effect of soaking your damaged negative in a very dilute solution of cyanide of potassium (¼ a grain to the ounce). It will remove the spots, but it must be watched closely during the operation, or the half-tints will be likely to suffer. As soon as the action has gone on long enough, wash rapidly in plenty of water.

A SUBSCRIBER.—In a recent number we gave all particulars concerning palladium and its chloride.

H. COOK.—Expose longer, or add one grain of bromide of cadmium to your collodion.

W. L.—If you will forward the pictures to us, you shall have our opinion on them.

E. B.—The bath could not have been sufficiently acid.

SULPHUR.—The cause of the yellowness which attacks the whites of your prints is, that during the fixing and toning a slight decomposition takes place, which gives rise to sulphuration. This may be avoided in the following way:—Do not tone and fix in the same solution, but on removing the prints from the printing frame wash them well in water, and then transfer to the *toning* bath; when toned, fix in *new* hypo., and afterwards thoroughly wash. For the details of the process, see an excellent article by "O" at the commencement of the present volume.

L. A. D.—You have made very fair progress in the three months you have been practising photography. The spots and other defects arise from local causes, which we could not point out unless we were to see your method of operating. Experience will soon show you how to avoid them. Albumenised paper always has a great tendency to turn brown in very hot weather.

Communications declined with thanks.—H. A. Y.—Philo Photo.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "PHOTOGRAPHIC NEWS:"—A. A. A.—Barley.—Dry Process.—O. W. L.—P. Q.

IN TYPE:—A. G. G.—J. E. G.—Captain R. N.—S. E. G.—Ignoramus.—M. A. Root.—Viator.—E. B.—B. M. Brackenridge.—Artizan Amateur.—H. and J. Walter.—A. F. Stafford.—Thomas Warwick.—Captain S. S. B.—W. L.—D. H.—A. N.—J. C. Browne.—Gwenthlian.—B. C. H.—G. H. W.

Editorial communications will not be received unless fully prepaid; and letters must not be sent in book parcels.

⁂ All editorial communications should be addressed to Mr. CROOKES, care of Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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THE SOLAR SPECTRUM.

In the "Photographic News" of the 22nd ult. (No. 46, p. 229), appeared an article, by Sir J. F. W. Herschel, upon a subject which the writer has made peculiarly his own. Ever since the first announcement to the scientific world of those wonderful phenomena of light-action, which are now comprehended under the general name of photography, Sir John Herschel's researches on the solar spectrum have been steadily and unremittingly pursued; and photographers and men of science (for the latter term does not always include the former) have been alike benefited by the important truths which he has so plentifully culled from this fertile field of research.

Now, in looking at any natural scene, every one is aware that, however carefully and steadfastly it is examined from one point of view, it is impossible to obtain more than a limited knowledge of the general bearing of the individual parts which form the whole. It requires *two* views, from different points of sight, to be examined simultaneously, for the observer to be able to isolate and examine the individual details, and to arrive at a just appreciation of the subject in its full entirety. And thus it is with one of Nature's truths; however assiduously or conscientiously an experimentalist has investigated the secrets of nature, the facts observed and the phenomena recorded require to be collated with other researches converging towards the same end, to be viewed, as it were, in a mental stereoscope, before the importance of the recorded facts and the strength with which they bear upon associated phenomena can be truly known and reasoned upon.

Sir John Herschel's beautiful investigations on the solar spectrum were, for the most part, given to the world at a time when we were in profound ignorance of even the existence of iodide and bromide of silver, and when our knowledge of the solar spectrum was limited to a few schoolboy tricks with a piece of cut glass. It was not until many years afterwards that we were incited, by a perusal of the above-mentioned experiments, to commence some investigations on the subject ourselves, and although we do not even wish to apply to ourselves the saying, that a dwarf on the shoulders of a giant can see farther than the giant, yet the dwarf may, perhaps, from the advantages of his position, discern individual details in such a way as to throw light upon phenomena which would otherwise remain inexplicable; and thus an account of some results which we have recently obtained, and which, at first sight, appear to be in direct contradiction to the effects obtained by Sir J. Herschel, may, perhaps, be read with interest by our readers; as we hope to be able to show that the apparent discordance between the two investigations are only such as are due to a difference in the point of view, and that they really differ only as two stereoscopic views of the same subject—which differ in order to more effectually evolve the truth.

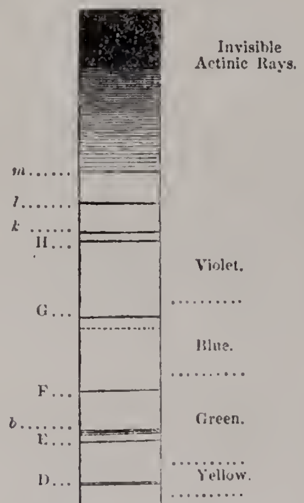
A ray of sunlight may be very well likened to a long rod consisting of parallel wires of different metals, each differing in properties from its neighbour. The bundle, as a whole, may produce certain results, but it will be in vain to inquire which wire or group of wires is the principal agent in any action, whilst they are all mingled together simultaneously. If, however, any force is made to act upon the compound rod, so as to bend it sideways, the parallelism of the wires will be destroyed. The power being uniform, each wire will *give* in proportion to its flexibility; and taking the three metals—iron, copper, and lead—as types of the rest, the iron, being the most able to resist the lateral force, will be least bent out of its original direction; the lead wire will be the one most bent, and intermediate between these two extremes will be the copper wire. The compound rod will thus be decomposed, and its elementary wires being now laid side by side, can be examined and experimented upon, without fear of the results obtained being vitiated by the presence of effects due to adjacent wires.

The phenomena of light and the solar spectrum are strictly analogous to the above. A beam of sunlight may be split up into its numberless elementary rays, and these may be presented to the experimental philosopher, each lying side by side and isolated from its companions, by allowing the original beam to pass through a *prism;* an instrument which possesses the property of bending each ray sideways. In this case also, as it was with our wires, each ray is bent (or refracted) in a different degree to its neighbours, and the result is the *solar spectrum*, the red end of which can be likened to the iron wire, the violet end to the lead wire, and the brilliantly-coloured, luminous part, to the copper wire.

Let us pursue the comparison farther. It will be easy to imagine that, if each individual wire of the bundle is of a moderate diameter—and the difference between the deflection of the lead, copper, and iron is extremely small—the wires might *diverge* from the point at which they were bent, but, at the same time, *overlap* each other to such an extent as not to show any blank spaces between them; if, however, their thickness is gradually diminished, a time will come when this overlapping will cease, and each wire will be isolated from its neighbours, and will show a vacant space on each side of it. This simile still holds good in the case of light. If the original beam of light which is deflected by the prism is of any considerable diameter, the component rays will overlap each other, and the resulting spectrum, although good enough for most practical purposes, will not be what is called *pure;* but if the aperture which admits the beam of light be reduced to about the $\frac{1}{100}$th of an inch, or less, in diameter, the elementary rays will present themselves unmingled with each other, and each will be seen separated from its neighbour by a blank, void space.

If a ray of light were strictly comparable to a metallic wire in the above-mentioned properties, nothing more would be required than an aperture of sufficiently small dimensions, and a prism, for obtaining at once this *pure* solar spectrum; but they differ in one important particular. The metallic wire will remain of a uniform thickness, whatever be its length; and, consequently, by regulating the aperture through which it originally passes, we regulate, at the same time, its diameter in every part of its subsequent course. Not so the ray of sunlight: this has the property of increasing in diameter the longer it gets; and, consequently, we must not only regulate its diameter at the commencement, but we must also take steps to counteract this diverging tendency, or else we shall have the separated rays overlapping at the spectrum as much as ever. This may readily be effected by means of a convex lens; and by introducing this into the path of the beam of light, near the prism, we obtain on the screen a *pure* spectrum. The appearance of this spectrum, of course, varies with the aperture originally employed for the ingress of the light. If it were a circular hole, $\frac{1}{100}$th of an inch in diameter, the spectrum would appear as a line of hardly any breadth. It would, however, be impossible to observe any fine and delicate black lines crossing such a spectrum; and, therefore, the plan is universally adopted of admitting the sunlight through a narrow slit (about 1 inch long by 0·005 inch wide) parallel to the refracting edge of the prism, and the spectrum then becomes a brilliantly-coloured band, about 1 inch broad, and crossed with an immense number of sharp black lines, of all degrees of visibility; the luminous lines being the elementary rays of the sunlight, and the black lines being the intermediate spaces where the rays are wanting. However the spectrum is formed, so long as the light is originally derived from the sun (*i. e.*, whether it be from a white cloud, the moon, or the planets), these individual rays are always bounded by the same black lines; and as these are of the greatest diversity of appearance in different parts of the spectrum, writers on this subject are in the habit of employing certain of the more prominent of these blank spaces as a means of identifying different parts of the spectrum; and, to certain of these, Fraunhofer (one of the first who observed these phenomena) gave the letters A, B, C, D, E, F, G, as a means of more ready identification.

The following diagram will serve to give an idea of the position of a few of the more prominent of the *fixed lines*, with respect to the colours in which they occur:—



At one side of the representation of the spectrum above given are dotted-off spaces, which we have assumed to represent about the space of the spectrum which can be said to be of the colour named. We must explain, however, that these dimensions are only arbitrary; no accurate mapping out of the coloured spaces is possible in the present state of our colour-nomenclature; and we believe that it will be very long, if the time ever comes, before we are able to give a definite name to each of the thousand different tints and hues which blend so marvellously one into the other, and even then no eye could, by any amount of practice, succeed in identifying any one of them by name. It is as if between each key on a piano twenty intermediate notes were introduced, subdividing the interval into as many separate sounds, each rising higher than the preceding one by one-twentieth of the full interval. No ear, however delicately attuned, could ever give more than a guess respecting the position, on the subdivided scale, of a particular note sounded; and when we have to make allowance for the almost untutored state of the eye as to colour, as compared with the exquisite perfection to which the ear has been cultivated, we shall be able to appreciate the immense boon which was conferred on optical science by the discovery of such unchanging landmarks as the fixed lines in the spectrum. We can now look upon the variegated colours of the brilliant band before us as a mere accident, dependent upon physiological causes, with which the student in this branch of science need have no concern; and, considering the spectrum, from the lowest refrangible heat-ray to the highest ray of actinism which has yet been able to struggle through our atmosphere, as but successions of ray-force lying side by side and separated by vacant intervals; we can proceed to examine its properties, and investigate its action upon material bodies, in total disregard of that opacity of the fluids of the eye, or insensitiveness of the retina, which allows us to *see* only a portion of the central part of the spectrum.

(*To be concluded in our next.*)

THE WAXED PAPER PROCESS FOR HOT CLIMATES.

BY MR. W. H. STANLEY CRAWFORD.

[A CORRESPONDENT at Bombay has sent the following description of a process which, he informs us, is practised with great success in that climate, where other processes which had been found to succeed perfectly in England, entirely failed. It is from the pen of one of the secretaries of the Bombay Photographic Society.—ED.]

It is admitted by every unsuccessful "Knight of the black tips"—as a wag has facetiously designated "*one of ours*"—that the various processes recommended by a variety of practitioners in England, present each and all some serious obstacle to the Indian amateur.

An "uncertainty of result" would seem to be the amount of experience acquired by every unlucky wight, who has followed implicitly the "plain directions" of one of these "guides," and this uncertainty has not unfrequently given rise to ungenerous doubts as to whether the author has fairly and conscientiously given the result of his experience, or whether the "instruction," like the "Jew pedlar's razors," is only intended to "sell." Doubts like these vanish when we have the authority of well known names, but the result remains the same, and for the best of all reasons—the instructor never for a moment contemplated an *Indian* pupil when laying down a course of instruction obviously intended for the exclusive benefit of those practising in Europe. Or if he did, we might justly, and without fear of being deemed uncharitable, assume that the *master* would have been as much at a loss how to proceed in his work, as the *man* himself would be in his endeavours—aided solely by an *English* guide—to unravel photographic causes and effects under an *Indian* sky.

It is a recognised principle in photography—and one that should be ever present to the mind's eye of the photographer—that temperature exercises an important influence on all bodies capable of being acted upon by the actinic ray. Any change of temperature, however slight, produces a corresponding effect on these "bodies," and we have no hesitation in stating it to be our belief, that to a neglect of this important principle is mainly to be attributed half the "annoying failures" which so many complain of. An amateur possessed of the requisite knowledge of the principles of organic chemistry, would have little or no difficulty in modifying a "process" so as to render it applicable to India—but of those who have acquired this knowledge, few, we apprehend, have the time or inclination to devote to an analysis of this nature; a process, therefore, like the following, which has received the test of local practical experience, is found to be uniform in its action, and by means of it an unlimited number of sheets of paper may be prepared to keep sensitive for a couple of weeks, cannot be regarded otherwise than as a boon to the Indian public.

After numerous and repeated trials of the various known photographic processes on paper, I have arrived at the conclusion that for general utility and certainty of action in the warm climate of India, none can be compared with the waxed paper process. In this particular branch, as in almost every other of the art, varieties of formulæ have been given, each having some peculiarity to recommend it; but of all that I have tried, those of Mr. Townshend and of Mr. How have appeared to me the simplest and the best.

My personal experience leads me to condemn as objectionable the very prevalent practice of putting into the iodising liquid large quantities of organic matter, such as whey, rice water, sugar of milk, gum arabic, isinglass, &c. &c. Paper so prepared, I find particularly liable to attract and absorb damp, especially during the monsoon, whereby it becomes, as a matter of course, charged with impurities, and, consequently, useless. I, as well as many of my friends, have suffered much inconvenience from this cause.

Coming into the field as I do after so many eminent photographers, it is naturally with feelings of much diffidence I put forward the following modification of the waxed paper process, and it is only that I know how different in many respects is the result of operations in a cold climate, to the effects produced in such a climate as that of Bombay, that induces me to give my Indian experience.

To wax paper, I shall give no particular formula, so many excellent modes having already been given, nearly all of which answer equally well here as in a cooler clime. For my own part I prefer purchasing ready waxed paper, thereby saving myself the inconvenience of a troublesome operation. In purchasing wax paper, however, it should be carefully examined sheet by sheet; those free from conspicuous flaws should be selected, and while having the appearance of being thoroughly saturated with wax and quite transparent, they should present no shiny patches on the surface, but a uniform dull smoothness; should shining patches appear on paper in other respects good, the objection may be got rid of by carefully ironing the sheet between folds of clear bibulous paper.

Waxed paper, whether in its plain state or iodised, should always be kept in a portfolio, and in as cool a situation as practicable.

The iodising solution I have found to answer best, is made as follows:—

No. 1. In 20 ounces of distilled water dissolve 480 grains of iodide of potassium.

No. 2. In 10 ounces of distilled water dissolve 96 grains of bromide of potassium, and then add 24 grains of chloride of potassium.

No. 3. In 10 ounces of distilled water dissolve 10 grains of cyanide of potassium.

No. 4. In 4 ounces of alcohol dissolve 5 grains of iodine.

Mix solutions No. 1 and 4 together, agitate well, and then add No. 2 solution to it and agitate well; finally throw in solution No. 3, and agitate well. This solution should be kept in a well-stoppered bottle covered from light, and will be of service till entirely expended.

When required for use, this liquid should be filtered through white clean bibulous paper into a pan of good depth, and as many sheets of paper as are required may be immersed one by one in it; care being taken that no air-bubbles adhere to the paper, either above or below, and that the liquid quite covers the whole mass of paper.

The paper should now be allowed to soak in this solution from 6 to 10 hours, after which it may be taken out sheet by sheet and hung up in a cool place (not exposed to much light) to dry; when dry it should be carefully wrapped in clean paper, and placed in a portfolio till wanted, and, with ordinary precautions, may in this state be preserved good for months.

The exciting solution is made thus:—In 24 ounces of distilled water dissolve 2 ounces of crystallised nitrate of silver; when dissolved, add glacial acetic acid 2½ ounces, and finally add 5½ ounces of alcohol.

Filter before use into a pan larger somewhat than the paper to be excited.

Into this solution immerse one sheet of the iodised paper (taking great care that no bubbles adhere) and allow it to soak for about five minutes, when it should be taken out, and if to be kept for several days, placed in a similar pan containing pure distilled water, rinsed in it for a minute or two, and then dried off between folds of *clean* bibulous paper, where it should be retained ready for use in the camera. As many sheets as are needed may thus be prepared one after the other, and when finished should be kept in a portfolio in a cool place, and most cautiously excluded from light.

To give any accurate time for the exposure necessary in the camera is almost an impossibility, but with a 3 inch view lens, ½ inch opening, and our ordinary Indian light, 5 to 6 minutes would be about the time required by this paper for buildings, but for foliage or dark masses of architecture in shade, 9 to 12 minutes would probably be better.

It may not be out of place here to impress upon the mind of the novice the absolute necessity of the most strict caution not to allow the least ray of daylight to get at the sensitive paper when not under exposure through the lens to a view. Camera slides, no matter how carefully made, cannot thoroughly exclude our bright sunlight, and the only plan to ensure certainty is to wrap several folds of yellow cloth round the slides when not in use. Too much care cannot be bestowed upon these precautions.

Paper made sensitive as above described may be kept, with the precautions advised, at least ten days with perfect confidence. I have worked with such paper 16 or 17 days after excitation, and found no appreciable diminution of effect, even in the time of exposure. It may also be kept several days after exposure in the camera before being developed. At the same time it is always advisable to use the paper as soon after excitation as possible, as involving less chances of failure in excluding mishaps which *might* intervene by the lapse of time. The same remark applies to the development, which in particular should, if practicable, be done within 24 hours after the exposure in the camera.

The developing solution is made by filling a bottle quite full with hot distilled water, and throwing into it as much gallic acid as the water will dissolve; when it will dissolve no more the solution should be allowed to cool and settle—then the clear liquid may be poured into a clean pan—say to the depth of ¼ of an inch. Into this the impressioned sheet is immersed and allowed to remain for 5 or 10 minutes. The picture rarely developes rapidly under this solution, there being so little free nitrate of silver left on the paper; it is necessary, therefore, to assist the development by throwing into it an ounce of the water in which the sensitive sheets were washed (which should be preserved in a bottle for this purpose); the picture will now rapidly develop and from this moment the process requires *very careful attention.* In the first place, to check it at the point when all the details of the picture are properly out; and in the next, if the developing liquid should show symptoms of browning (decomposition), which in this climate will speedily occur in gallic acid to which free nitrate of silver has been added, to replace it immediately with fresh; a neglect of this precaution may perhaps destroy what would otherwise have proved a good picture.

The time that the process of development occupies varies so much that none in particular can be stated. However, a picture is seldom out in less than a quarter of an hour, and it *may* be 12 or 20 hours if the exposure in the camera was too short a time; in the latter case particular care must be taken to renew the gallic acid solution should it show symptoms of becoming brown.

A picture should be allowed to go on developing so long as the whites or half tones do not suffer, that is darken. When all the details appear distinctly visible, the sheet of paper should be held up between the eyes and a light; if the blacks in this position present a density impenetrable to light, the whites a clear transparency, and the half tones a relative value, the operation should be stopped, the picture put into a pan of clean water and brushed on both sides with a soft, broad. camel's hair brush to remove any deposit that may have settled upon it; if allowed to remain thus for about half an hour, nearly all the acid will be washed out; it should then be passed through a fresh pan of water, and, afterwards, to remove the iodide, placed in a bath of cyanide of potassium made as follows:—

Cyanide of potassium	80 grains.
Water	16 ounces.

Filter for use.

This bath is preferable to one of hyposulphite of soda, inasmuch as it acts more quickly, is less bulky, and is safe in operation, for nothing can be more injurious in working than hyposulphite, the least contact of which is destructive to the exciting and iodising baths.

The cyanide bath is *very energetic*, and consequently the picture requires much attention when in it; for, if left beyond the time sufficient to dispel the yellow iodide, it will, in continuing its action, reduce also the blacks—indeed it would, if left for any lengthened time, entirely obliterate the picture.

If a hyposulphite bath is preferred, the following will be found to answer well:—

Hyposulphite of soda	3 ounces.
Water	20 ounces.

Filter.

When the iodide has thoroughly disappeared the picture should be washed for an hour in several changes of water (say four or five times), and in a good supply of water each time, it should afterwards be hung up to dry.

When thoroughly dry, expose to the sunshine for a few minutes, and finally iron with a moderately heated iron; this operation renews the transparency of the paper which in its continued and repeated washing is in general somewhat impaired.

In conclusion, I have only to recapitulate and throw out a few further precautions. Adopt the utmost cleanliness in every stage of the operation. Use no chemicals but what are guaranteed as the best. In exciting, use in the dark room no more light than sufficient to enable work to be done with comfort. Use *fresh clean* bibulous paper for blotting off the paper after exciting. Filtered or otherwise, let all the solutions be perfectly clear and limpid. Use the greatest care in preserving the excited paper from the least ray of light when not under exposure in the camera, and so till the picture is developed. Never use the gallic acid bath after it has browned at all. After fixation in the cyanide bath wash thoroughly in water to remove every trace of that solution. The paper, in every stage—in its plain, iodised, excited, impressed, and completed state—should always be wrapped in clean paper and laid flat in a portfolio, kept in a cool place. In this climate every camera for outdoor work should have a thick yellow quilted cover, which both serves as a protection to the wood, and excludes white light which might gain admission by any barely perceptible flaw, and also assists materially in maintaining a cool atmosphere about the paper. The lens must of course be wiped occasionally; perfect knowledge of the proper use of the various sized diaphragms can only be acquired by experience and practice, but, as a general rule, the smallest sizes, compatible with the amount of light available, should be used.

FALL OF AN IMMENSE AEROLITE—PARAMOUNT IMPORTANCE OF PHOTOGRAPHY.

"A few weeks ago the inhabitants of the towns of Boylston and Redfield, in Oswego County, New York, United States, were startled by the occurrence of a remarkable phenomenon—the descent from the heavens of an immense meteoric mass. The body struck the earth, between the hours of three and four in the morning, with a crash that was truly terrific, and the shock was sensibly felt, and people aroused from their slumbers, at a distance of five miles from the scene. The body fell upon the farm of Horace Tanger, situated on the line of Boylston and Redfield, striking in a meadow, and partially on the highway. It is estimated, by our informant, to cover half an acre of land. The earth was torn up in a terrible manner, and large fragments were thrown a distance of two-thirds of a mile. The mass is very irregular in shape, and rises at some points to sixty and eighty feet in height, and is supposed to be imbedded in the earth as many feet. The surface generally has the appearance of iron ore. The excitement occasioned by the event among the inhabitants was intense, and the crash is said to have been terrific beyond description. Many supposed that the final winding up of terrestrial affairs had arrived."—*Oswego Palladium.*

We consider the above occurrence, so fully stated by our American cotemporary, as most extraordinary. Although the words "*lapidibus pluisse*"—"it rained stones"—occur several times in Livy, yet we do not know of any case where such an immense mass of a meteoric stone was ever projected in times historical. It will surely be an object of much research, and of interesting photographic delineation —*mineralogical* heliography being one of the next steps of that Art, of which it also may be said—

"Eripuit lumen Soli . . . ."

Of meteoric stones, of an ante-historical origin, there are some huge ones lying in Siberia, examined by Pallas; and there is some large meteoric copper near Bahia, in the Brazils, in India, &c. But on comparing the forms of those aerolites (even those in the British Museum), the thought obtrudes itself, whether those huge gold nuggets of Australia might not be as well projections of the atmosphere, as it is difficult to conceive how masses of gold, of some thousands of ounces weight, could have yielded to any terrestrial (volcanic) heat, &c. The photographic reproduction of similarly interesting nuggets through the camera will be of much interest, as they soon pass away in the assayer's crucible.

As far as relates to the huge mass of Boylston and Redfield, it would have been an object of great importance to have had it photographed soon after its descent; because, as such meteoric metals descend mostly in a very high state of temperature—molten internally, &c.—the first sight thereof might have conveyed interesting information. It is such important phenomena which will spread photography over the whole world, as in numerous, nay, most cases, there is no draughtsman within reach capable of seizing such objects, so as to make his work useful to the geologist.

As the subject of mineralogical or geological photography has hardly yet been touched, it may not be out of place to throw out a few hints to persons who intend to take up the matter. To begin first with large faces of rocks, gulleys, crevices, earth slips, *éboulements*, &c., it will require some preparatory study to select such as are of greater interest—the cropping out, and the stratification of, various geological formations, so-called *faults*, &c. Still, a little study and a little experience will soon impart to the photographic traveller the necessary tact of selecting, at least, not quite worthless aspects. But even large views of entire mountain ranges, if not taken at too great a distance, will, especially in *new* countries, be of importance; because geology has arrived at that point, that the very sight of a mountain range will tell the traveller to what *formation* it belongs—primary or secondary, granite or limestone, porphyry, volcanic formation, &c. There is great pleasure in thus reading

Nature's great works at *sight*, and it must be an equally great pleasure for the photographer to seize these vast nature-scenes—sights the grandest we ever can behold.

But even the representation of single *specimens* of minerals, from that huge one covering the area of *half an acre*, to smaller ones that cannot be brought away, is of great importance. Even in the most remote mines of the world, there are collections of specimens, made by the officers, which they will not part with, the easy and accurate reproduction of which, by *moving a slide*, is desirable. If huge masses of single rocks are to be delineated, the old rule of choosing the best and most interesting stand-point is to be observed. At times, as a matter of course, more than one view will be desirable; but after this has been done, recourse must be had to the *sledge-hammer*, a very useful assistant to the travelling mineralogist and mineralogical photographer. Wherever practicable, large corners of the rock, which has been previously examined and depicted, are to be hewn off, and these new faces (fractures) introduced in the camera.

For the sake of showing what remains yet to be done, exclusive of those numberless Swiss sceneries hitherto represented, we may state, that only forty-eight hours' rail from London, there are the giants' mountains (*Das Riesengebürge*)—not properly Alps—still containing some of the softest and finest mountain, meadow, and glen scenery; which, if rendered in large plates, would present, perhaps, the most idyllic scenery in Europe. Not far off thence is the *Adersbacher Felsen*—huge masses of sandstone, stuck column-like in the soil, and forming a natural Stonehenge. In the vicinity lies a fossil forest of some millions of antediluvian trees (*Liriodendrum*), which, to the judicious artist, would yield great and ample scope; and thus we may be permitted, traveller-like, to conclude with a passage of the Koran:—"God's is the Orient, and God's is the Occident—all full of His glory."

SUBSTITUTION OF OXYPHENIC ACID FOR PYROGALLIC ACID.

Mr. R. Wagner recently proposed to replace in photography the pyrogallic acid by an acid possessing similar properties, and the preparation of which might doubtless be undertaken more economically than that of the former. This acid, which may be prepared by various methods, is oxyphenic acid, the composition of which is $C_{12}\,H_6\,O_4$. The following instructions may serve as a starting point for researches, which would be doubtless both very interesting and very useful:—Pyrogallic acid being one of the most precious agents used in photography, but also one of the most costly, it would therefore be of importance to discover a substitute. The presence of oxyphenic acid in crude pyroligneous acid, should chiefly attract the attention of manufacturers of chemical productions. The process recommended by M. Buchner in order to extract it is, moreover, economical. It therefore only remains to determine the quantity contained in the crude pyroligneous acid, and to arrange the work in such a manner that no portion of this quantity should be lost.

Oxyphenic acid, $C_{12}\,H_6\,O_4$, identical with pyrocatechin and pyromorintannic acid, possesses properties very similar to those of pyrogallic acid. It is very soluble in water and alcohol, pretty soluble in ether. It crystallises in colourless rectangular prisms; the crystals, dried at 80° cent., fuse at 110° to 115°. The fused matter boils at 240° to 245°. The vapour is colourless, and condenses into a liquid, which, when cooled, forms beautiful crystals. The aqueous solution presents a re-action scarcely acid, and possesses a slightly better flavour. It easily reduces salts of silver and the chlorures of gold and platinum. Upon rendering it alkaline by means of a little potash or of caustic ammonia, it rapidly absorbs oxygen—becoming green (and not red, which distinguishes it from pyrogallic acid), then brown, and, finally, black and opaque.

It does not change the proto-salts of iron, but yields, in conjunction with perchloride of iron, a deep green colour, which, upon the addition of an alkali, changes to red, and again becomes green by saturating the alkali with an acid. Such are the reducing properties of oxyphenic acid, which have led to its suggested employment in photography instead of pyrogallic acid.

Oxyphenic acid is obtained by the dry distillation of catechu, of morintannic acid, from tin, from copper, from Peruvian bark, from kino, from the roots of krameria triandra, of zomentilla crecta, polygonum, bistorta, &c., and, in general, from the roots of all plants containing a tannin, which has the property of turning green the salts of iron. Pettenkofer has shown its existence in crude wood vinegar.

M. Buchner points out the following process for obtaining oxyphenic acid by means of the crude wood vinegar, or of pyroligneous acid, which may contain about two per cent. by weight:—

Pyroligneous acid is distilled (an operation generally performed in the factories producing this acid, and the pyrolignites of lead or of iron), and the siropy residue is shaken up with a concentrated solution of common salt. The latter dissolves but very few pitchy matters, but takes possession of the oxyphenic acid. The liquid, separated from the pitch, is agitated, in its turn, with an equal quantity of commercial ether; this latter dissolves the oxyphenic acid. The etherial solution, which also contains acetic acid and tarry oils, is decanted, and then distilled. When nearly all the ether is volatilised, the temperature is raised, and, at the same time, a current of carbonic acid is passed through the retort. There first distils the acetic acid, then the oxyphenic acid or pyrocatechin, and, lastly, a thick brown oil. The middle portion becomes, on cooling, a crystalline *magma*, which is expressed, and again sublimed in a current of carbonic acid, if it is required to obtain colourless crystals. These have the composition, $C_{12}\,H_6\,O_4$, and are oxyphenic acid. It has not been possible to detect the presence of this body in the pitch or tar of pit coal.

It is probable that a rather concentrated solution of chloride of calcium (such as is obtained in operating upon the residues of the preparation of chlorine by means of hydrated caustic lime) may be substituted for the solution of marine salt, and sulphide of carbon instead of ether. This slight modification of the process of preparation would, perhaps, cause the pyrocatechin or oxyphenic acid to be obtained at prices considerably below that of pyrogallic acid.

DETERMINATION OF THE DIURNAL AMOUNT OF LIGHT BY THE PRECIPITATION OF GOLD.

BY PROFESSOR JOHN C. DRAPER, M.D.

Plants depending to a great extent on the amount of light received from their growth and nutrition, it is very desirable that we should have means for the measurement of quantities of light, such as those we have for measuring heat. Those, too, who are engaged in photographic pursuits, must have often desired to measure the amount of light of one day compared with that of another; or of one portion of time compared with that of another portion. I shall not, therefore, need any excuse for introducing to your notice a process for the "Determination of the Diurnal Amount of Light."

Various attempts have been made to construct a photometer which would accomplish such a result; and among the substances that undergo change under the influence of light, and which might serve the above purpose, is the peroxalate of iron, first suggested by Professor John W. Draper, in the *Philosophical Magazine* for 1857.

On being exposed to light, peroxalate of iron gives off carbonic acid gas with effervescence, and gains the power of precipitating metallic gold from a solution of perchloride of gold—the quantity of gold precipitated depending on the amount of light to which the sensitive solution has been exposed.

The difficulty attending the use of this method is, that when the decomposition has fairly set in, the solution becomes turbid, owing to the precipitation of protoxalate of iron; this may, however, be remedied, by adding to the peroxalate a little perchloride of iron, which mixture of peroxalate and perchloride may be exposed for a considerable time to the action of light without any turbidity arising; and, on the addition of perchloride of gold, gives a precipitate of metallic gold. All that then remains is to weigh the gold precipitated, and we have represented the amount of light.

Preparation of the Sensitive Solution. — A measured amount of oxalic acid is boiled to saturation with freshly-precipitated peroxide of iron. The resulting peroxalate is filtered—the filtrate being received in a test-tube containing a little perchloride of iron—and the contents of the filter washed until the mixture in the test-tube amounts to ten cubic centimètres—the quantity used.

In the following experiments, the above sensitive solution was exposed to a north light, or rather to the region about the pole, in a tube of thin glass, $\frac{56}{100}$th of an inch in diameter, which was placed in a box, darkened in the interior, so as to absorb all stray rays. Such an arrangement served to measure the quantity of light for half a hot summer's day; a similar solution, in a similar tube, being substituted at mid-day.

As soon as the period of exposure ceased, perchloride of gold was added to the contents of the exposure tube as long as it caused a precipitate. This precipitate was then collected on a filter, washed, dried, ignited, and weighed. The result indicated the comparative amount of light in the diffuse light of the period of exposure.

As examples, I cite the following experiments:—

No. 1.—September 7th, 1858. Perfectly clear; temp., 76°; dew point, 66°; barometer, 29° 68′; gold precipitated, 56 milligrammes.

No. 2.—November 4th, 1858. Very dark and raining; temp., 47°; dew point, 46°; barometer, 29° 60′; gold precipitated, 7 milligrammes.

These experiments serve to show the capabilities of the process, and may, perhaps, recommend a trial of its merits to such as are interested in photometric pursuits.

A VISIT TO A PHOTOGRAPHIC PAPER ESTABLISHMENT.

We have just returned from a visit to a photographic paper establishment, which may with good reason be termed the most important in existence,—we allude to that of M. Marion, at Courbevoie. We had long desired to make this visit, when chance, without any effort of the will on our own part, led us so near the factory that we decided on availing ourselves of the opportunity to inspect the arrangements of the establishment which turns out such an amazing quantity of photographic paper, ready prepared and otherwise.

In the midst of a whole tribe of work-people of both sexes and every age, we distinguished M. Marion, who, while engaged in manual operations like a simple journeyman, kept his eye on everything that was passing around him. Guided by him we were enabled to follow all the operations in succession which the paper underwent in the hands of the several persons through whom it passed.

The woman who applied the albumen (for in this as in most other large establishments of a similar kind, they employ a woman for this duty) was placed between two apprentices, the first of whom handed her one of the sheets of paper received from the foreman, and which she placed in three or four basins consecutively, according to the degree of perfection it is intended that it shall undergo, after which these sheets are fixed by the second apprentice on little wooden triangles, which are themselves supported on a larger one which traverses the whole length of the workroom. When they are thoroughly dry, they are removed by two workmen, who finish them previous to packing up in reams. This is all accomplished with automaton-like precision and regularity, and without the loss of a second.

Some idea of the development which photography has undergone both in France and abroad, may be formed by the enormous quantity of prepared paper sent out from this factory, almost enough to make one believe that all the inhabitants of Europe are engaged in its practice. We saw a vast case filled with it and addressed to one of our artists following the march of our army, and we looked with a respectful eye on the unsullied sheets destined to become the irrefutable pages of a glorious history. . . . .—*La Lumière.*

Dictionary of Photography.

Fluorescence (*continued*). — "Sir David Brewster had several years before discovered a remarkable phenomenon in an alcoholic solution of the green colouring matter of leaves, or, as it is called by chemists, chlorophyll. This fluid, when of moderate strength and viewed across a moderate thickness, is of a fine emerald green colour; but Sir David Brewster found that when a bright pencil of rays, formed by condensing the sun's light by a lens, was admitted into the fluid, the path of the rays was marked by a *bright beam* of a *blood red colour.** This singular phenomenon he has designated *internal dispersion.* He supposed it to be due to suspended particles which reflected a red light, and conceived that it might be imitated by a fluid holding in suspension an excessively fine coloured precipitate. A similar phenomenon was observed by him in a great many other solutions, and in some solids; and in a paper read before the Royal Society of Edinburgh, in 1846, he has entered fully into the subject.† In consequence of Sir John Herschel's papers, which had just appeared, he was led to examine a solution of sulphate of quinine; and he concluded from his observations that the 'epipolic' dispersion of light exhibited by this fluid was only a particular instance of internal dispersion, distinguished by the extraordinary rapidity with which the rays capable of dispersion were dispersed.

"The lecturer stated, that, having had his attention called some time ago to Sir John Herschel's papers, he had no sooner repeated some of the experiments than he felt an extreme interest in the phenomenon. The reality of the epipolic analysis of light was at once evident from the experiments; and he felt confident that certain theoretical views respecting the nature of light had only to be followed fearlessly into their legitimate consequences, in order to explain the real nature of epipolised light.

"The exhibition of a richly-coloured beam of light in a perfectly clear fluid, when the observation is conducted in the manner of Sir David Brewster, seemed to point to the dispersions exhibited by the solutions of quinine and chlorophyll as one and the same phenomenon. The latter fluid, as has been already stated, disperses light of a blood-red colour. When the transmitted light is subjected to prismatic analysis, there is found a remarkably intense band of absorption in the red, besides certain other absorption bands, of less intensity, in other parts of the spectrum. Nothing at first seemed more likely than that, in consequence of some action of the ultimate molecules of the medium, the incident rays belonging to the absorption band in the red, withdrawn, as they certainly were, from the incident beam, were given out in all directions, instead of being absorbed in the manner usual in coloured media. It might be supposed that the incident vibrations of the luminiferous ether generated synchronous vibrations in the ultimate molecules, and were thereby exhausted, and that the molecules in turn became centres of disturbance to the ether. The general analogy between the phenomena exhibited by the solutions of chlorophyll and of quinine would lead to the expectation of absorption bands in the light transmitted by the latter. If these bands were but narrow, the light belonging to them might not be missed in the transmitted beam, unless it were specially looked for; and the beam might be thus 'epipolised,' without, to ordinary inspection, being changed in its properties in any other respect. But on subjecting the light to prismatic analysis, first with the naked eye, and then with a magnifying power, no absorption bands were perceived.

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* Edinburgh Phil. Trans. vol. xii. p. 542.

† Vol. xvi. part 2, and Phil. Mag. June, 1848.

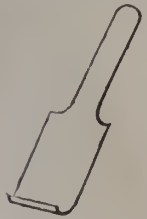
"A little further reflection shewed that even the supposition of the existence of these bands would not alone account for the phenomenon. For the rays producing the dispersed light (if we confine our attention to the thin stratum in which the main part of the dispersion takes place,) are exhausted by the time the incident light has traversed a stratum the fiftieth of an inch thick, or thereabouts, whereas the dispersed rays traverse the fluid with perfect freedom. This indicates *a difference of nature* between the blue-producing rays and the blue rays produced. Now, as the lecturer stated, he felt very great confidence in the principle that the nature of light is completely defined by specifying its refrangibility and its state as to polarization. The difference of nature, then, indicated by the phenomenon, must be referred to a difference in one or other of these two respects. At first he took for granted that there could be no change of refrangibility. The refrangibility of light had hitherto been regarded as an attribute absolutely invariable.* To suppose that it had changed would, on the undulatory theory, be equivalent to supposing that periodic vibrations of one period could give rise to periodic vibrations of a different period—a supposition presenting no small mechanical difficulty. But the hypotheses which he was *obliged* to form on adopting the other alternative, namely, that the difference of nature had to do with the state of polarization, were so artificial as to constitute a theory which appeared utterly extravagant.

(*To be continued.*)

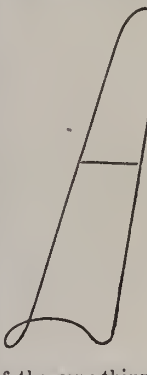
The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

A DIPPER for the nitrate of silver bath is easily formed of gutta percha. A good deal of difference of opinion has been expressed as to the best material for dippers; personally, we prefer those of porcelain. But where dippers of a material liable to break are used, it is generally desirable to possess a supplementary one, or ready means of making one; for this purpose, if not for general use, gutta percha will be found useful. The usual form of a gutta percha dipper, and the one most easily made, consists of a strip of gutta percha of the requisite length, about an inch and a half broad, and about a quarter of an inch thick, with one end turned up to form a rest for the plate, something like the subjoined engraving. A dipper of this shape possesses, however, two or three disadvantages. The first objection is one that applies equally to glass dippers, if formed the same way,—that is, by turning up the end—namely, the lodgment that is afforded for a small quantity of nitrate of silver in the groove formed by the bent end of the dipper. The collodionised plate when placed on the dipper, at once rests in a small well of the solution, and a stain along the top of the picture is the general result. We have pointed out this as the source of evil in several instances, where we have been asked to assist in discovering an apparently inexplicable cause of constantly recurring stains. Another disadvantage of these dippers is their want of firmness and rigidity. In lifting the plate out of the bath they are apt to bend backward, and thus risk throwing the plate against the front of the bath, to the damage of the film. To those whose experience has taught them to distrust the action of gutta percha on the bath solution, there is in this form of dipper quite sufficient surface of gutta percha to prove an objection.



All these disadvantages are, however, obviated in the dipper we shall next describe. We refer to the form first recommended, we believe, by Mr. Lake Price, who suggests the use of pure silver wire for the material. This material, whilst costly, is unnecessary, as all the advantages may be secured without the cost, by using common wire coated with gutta percha. The advantages are lightness, simplicity, and efficiency. Its lightness removes the risk of breaking a glass bath by jarring roughly against the bottom—a circumstance which does sometimes happen in using a dipper of heavy plate glass. It is easily made, the bending of the wire and covering with gutta percha requiring no especial manipulatory skill. It answers the purpose well, the plate neither slipping off, nor adhering obstinately by capillary attraction, as in glass dippers; no rest is afforded to the solution so as to cause stains; and the small surface of gutta percha presented to the action of the bath, removes the objection arising from its supposed injurious tendency.* The annexed engraving gives the form of the dipper in question. A piece of wire, either iron or brass, copper being too soft and pliable, having been procured of the proper strength and thickness—that being regulated, of course, by the size of the intended dipper—will be easily bent to the desired shape. It should be joined at the top, either by soldering, riveting, twisting the ends together, or wrapping with a piece of finer wire, as may be most convenient to the manipulator. The stay across the middle is to give strength and firmness, and need only be used in large dippers. This done, it may be coated with gutta percha in several ways, when that material is rendered plastic; but the simplest, neatest, and most efficient, will be as follows: procure some of the very thinnest sheet, the satin tissue will answer best, and cut into strips about half an inch broad; now heat the wire gently, not making it too hot, in the flame of a spirit lamp; then proceed to wrap the strips of gutta percha round the wire in a spiral direction till the whole is covered. This done, pass the whole quickly through the flame of the spirit lamp, heating it just sufficiently to make the overwrapping edges tacky, and, wetting the fingers to prevent them sticking, ply the edges gently together until the whole is joined. This wrapping may again be repeated two or three times, the edges again being joined by the flame in the same manner. Before applying each successive wrapping, it will be well to rub the surface with a little benzol to remove all greasiness resulting from fingering, otherwise there will be danger of the second wrapping not adhering to the first. By this means a neat and perfect coating, completely insulating the wire, may be obtained. Care, of course, should be taken that no spot be left uncovered or unjoined; or injurious action on the bath would be the result.



Where the very thin sheet is not easily procurable, the best plan would be to take a piece of any shape to be most readily obtained, and rendering it plastic or ductile by heating in hot water, pull it out into long, thin ribbons, and then use it in the manner we have described.

These dippers, after coating with gutta percha, may, if it be considered desirable, be further protected from the action of the silver solution by varnishing with shell-lac, as we have described in a former article.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 1*st August*, 1859.

THERE is at the present moment a great scarcity of photographic news here. The Paris journals are full of extracts from English papers, and give no original news whatever.

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* It is true that the phenomenon of phosphorescence is in a certain sense an exception; but the effect is in this case a work of time, which seems at once to remove it from all the ordinary phenomena of light, which, as far as sense can judge, take place instantaneously. It is true that there now appears a close analogy in many respects between true internal dispersion and phosphorescence. But while the nature of epipolized light remained yet unexplained, there was nothing in the former phenomenon to point to the latter.

* Before finally quitting the subject of gutta percha, we shall probably give a brief *resumé* of the communications we have received regarding its injurious action on photographic chemicals, with some comments on the evidence afforded by our correspondents.

La Lumière has actually reproduced a note published by M. Schœnbein in 1847! This note, however, although old to the chemical world, may not be so to photography. The latter is making rapid progress, as may be witnessed in the Great Exhibition at the *Palais de l'Industrie*, and every chemical fact relating to the photogenic action of light becomes of more importance every day. On this account I think it may be interesting to reproduce M. Schœnbein's little note here, for when the latter was formerly published photography was far indeed from occupying the high position it does at the present day.

M. Schœnbein observed, then, that a solution of ferrocyanide of potassium, preserved in the dark, retained its transparency and underwent no change of colour, however long it was kept shut up in complete darkness; but as soon as this solution was exposed to the sun its colour was seen to become darker, and hydrocyanic acid was disengaged, or, at least, an unmistakable smell of prussic acid was given out, whereas the solution of ferrocyanide of potassium has no odour when recently prepared. At the same time, a precipitate of peroxide of iron is formed, and when this has been deposited and the liquid has lost its odour of hydrocyanic acid, the latter is found to have an alkaline reaction.

This curious decomposition takes place more rapidly if pieces of linen or cotton be steeped in the solution and then exposed to the sun; and M. Schœnbein has assured himself that a clear, transparent solution of ferricyanide is decomposed in the same manner as the ferrocyanide.

It is curious to observe the relative number of the various processes employed by photographers, who have exhibited proofs at the Great Exhibition of the Photographic Society, at the *Palais de l'Industrie*. We have the following:—

Damp collodion (Archer)	700	specimens.
Dry collodion	26	„
Taupenot's method	55	„
Collodion and albumen (divers methods)	10	„
Collodion and honey	4	„
Dry collodionised paper	9	„
Waxed paper (Talbot)	209	„
Waxed linen	17	„
Waxed turpentine paper	1	„
Paper wet and dry	43	„
Albumen (Nièpce)	8	„
Total	1,073	„

But, as a great number of the exhibitors have not made known their processes, this figure will not convey any idea of the number of proofs contained in the exhibition.

The process on turpentined paper, which has only one representative in the whole exhibition, is by a M. Bonuefond; the proof represents a view of the Quarries of St. Denis, but I have not seen it, nor do I know anything of the process, except that M. Bonnefond calls it *Papier-térébenthino-ciré-ioduré*, a sort of *multum in parvo* definition, and a word that will not find its way into any dictionary until photography has made still further progress!

Mercury has played an important part in photographic art, and is still considerably employed. M. Ulex has made known a process by which this metal may be purified. It consists in adding to it a concentrated dissolution of perchloride of iron, and shaking the mixture. One part of perchloride is employed for 16 parts of mercury. The liquid mixture separates, when allowed to repose, into two parts, one consisting of the purified metal, the other forms a greyish mass, which, when treated with hydrochloric acid, causes the separation of more pure mercury. In this operation it often happens that a small quantity of calomel is formed; this may be separated and decomposed. This process is not new; it was first proposed, many years ago, by M. Dumas, who showed that chloride of copper acted in the same way as the perchloride of iron. If the mercury contain silver and gold, this method of purification will not separate them, and I think that when pure mercury is desirable, it would be far better to submit the impure metal to the old process of distillation, or to press it through some fine chamois leather, than to act upon it incompletely by dissolution of iron or copper, after which treatment it must be well washed to get rid of the metallic solutions.

A new salt has been formed by an Italian chemist, M. Passerini, who denominates it *pyrophosphate of bismuth*, and ascribes to it the formula—$2Bi_2O_3PO_5$, though he brings forward no analysis to prove his assertions. However that may be, the salt in question is prepared by double decomposition: an acid solution of crystallised nitrate of bismuth (4 parts of nitrate to 48 of water), is precipitated by a solution of pyrophosphate of soda. A voluminous white precipitate is formed, which is well washed and dried.

When dry, this new salt forms a white amorphous powder, without smell and almost without taste; the air has no action upon it; it is insoluble in water, alcohol, and acetic acid; soluble in warm hydrochloric and azotic acids; decomposed by sulphuric acid. It is insoluble in pyrophosphate of soda and in citrate of ammonia.

M. Victor Legrip, a pharmacien at Chambon (Creuse), relates a curious observation, which appears to show that sulphuric acid may be formed in the air during a storm.

On the 4th of June last, at 2 o'clock in the afternoon, a storm broke over Chambon. Hailstones accompanied the heavy rain. M. Legrip remarked that the wainscot of his pharmacie, which had been newly varnished with linseed oil, containing oxide of lead, presented a great number of white spots; apparently, the number of these spots coincided with that of the hailstones which had struck against the wainscot. On each spot was a drop of white, milky liquid. A certain quantity of these drops were collected by means of a piece of clean muslin and distilled water. It was not difficult to prove that the white matter the liquid held in suspension was *sulphate of lead*.

M. Chevreul has lately shown the existence of *oxalate of lime* in the greasy impurities that are washed from the wool of the sheep and the alpaca. In seeking a means of obtaining pure oxalic acid from these matters, in order to put the question out of all possible doubt, he discovered a very pretty reaction, namely, that of nitrate of silver on oxalate of lime. One part of oxalate of lime dried at 40° (centigrade), and containing 2 atoms of water and 2·07 parts of fused nitrate of silver, dissolved in 20 parts of water, are maintained from one to three hours, at a temperature approaching 100° (centigrade). In this manner many grammes of oxalate of lime may be completely decomposed. The insoluble oxalate of silver thus formed is well washed and then touched with a few drops of hydrochloric acid, it is immediately transformed into chloride of silver and pure oxalic acid, which may be crystallised from the liquid after the separation of the chloride of silver.

The Russian University of Kharkow, in Ukrainia, has just come into possession of an *enormous electric battery*, perhaps the largest ever known; it is composed of 1,000 Bunsen's elements; and, in a letter addressed to the Paris Academy of Sciences, the professors of the Russian University inform the French *savants* that they intend, from the 1st to the 10th of September next, to execute numerous experiments with this great battery, principally with the view of elucidating certain questions which have been subject to controversy. The Russian professors hope that the members of the Academy of Sciences will help them in their undertaking by proposing any experiments which they may think important to science at the present moment.

M. Naudin, a distinguished French botanist, has just written an extensive monography on the *plants of the melon tribe*. The author describes 21 distinct species of melon, many of which give rise, by crossing, to numerous varieties. This work forms part of a still more extensive one, in which M. Naudin proposes to discuss thoroughly the interesting question of the real origin of our cultivated vegetables. Though I have not the pleasure of knowing M. Naudin personally, I think it would be difficult to find a naturalist more fitted to work out so difficult and so interesting a question.

On a proposition, made by the Belgian Minister of the Interior, M. Rogier, the Chambers have adopted the following measures, which render a noble homage to science and to my much-esteemed and much-regretted friend, the late Professor Dumont, of Liège:—

1st. To accord to Madame Dumont, independently of the modest pension which she receives as the widow of a professor, an annuity of 2,000 francs, reversible entirely upon her three children until the youngest attains his majority.

2nd. To open an extraordinary credit of 25,000 francs, in order that the government may acquire the mineralogical collections, the notes, manuscripts, and geological maps, left by M. Dumont.

THE MANUFACTURE OF COLLODION.

To the Editor of "The Photographic News."

Sir,—When a man communicates information which is of so simple a character as to have rendered it impossible that it should not have been observed by everybody interested in the subject to which it refers, he is usually considered to be engaged in a task of which we all know the popular description. This would apply to Mr. Watt's communication, published in the "Photographic News" of last week, which not only contains superfluous advice, but is in many respects erroneous. In the first place, it is incorrect to suppose that a superior ether, for our purpose, could be prepared by getting samples from different houses and mixing them together. What would constitute the superiority of the substance so prepared? I presume Mr. Watt thinks that different samples of ether have different qualities, and that by mixing them together an ether is obtained which possesses a combination of all those qualities. Now, the nature of ether is always the same, and though there may be differences in the strength of one sample and another, we are perfectly aware of the strength of each, and use that which experience teaches us to be the best suited for our purpose, and not the vague substance which he advises us to employ.

With respect to pyroxiline, can anybody suppose that we manufacture only just sufficient at a time to make one batch (whatever quantity that may be) of collodion, and that pyroxiline made at different times is kept carefully separate? Why, it would have occurred to everybody, I should imagine, that we prepare pyroxiline on the same principle as every other manufacturer prepares the staple of his manufacture; that is to say, we keep a stock of it to be drawn upon as circumstances may require.

The same observations which applied to the ether will apply also to the remarks respecting the alcohol. I obtain all of this substance I require from a wholesale dealer, who furnishes it to me of a specified strength, but I do not trust to him to do my business, but subject it myself to rigorous purification, so as to get precisely what I want; a much more satisfactory method, I take it, than adopting the suggestion of mixing a lot of samples together anyhow. As to the precautions he advises us to take with respect to the iodising solution, I can assure him that it is superfluous. We are perfectly alive to the importance of adding a certain amount of iodide to the collodion; indeed, I am surprised that it did not occur to him that to advise us on such an essential part of our business, was very much the same thing as telling a brewer that it is necessary to add a certain amount of malt to the water to make good beer. As to his having had to complain to a manufacturer that he had found a considerable deposit of crystals in his collodion, I can only say, that in all my experience I never had such a complaint made to me; indeed, it would be impossible, as I—and I have no doubt every other manufacturer does the same—never send out an article until its working qualities have been carefully tested.

I have no desire to impugn the accuracy of Mr. Watt's statements; but I cannot help looking upon his assertion that he has used negative collodion made by seven different makers, and that the collodion he has obtained from the same house on five or six occasions differed so much one from the other as to possess entirely different characters, as being very extraordinary.

As to the relative thickness or thinness of collodion made by different manufacturers, that is a matter for photographers; they have the power of choosing that which they prefer, and if they found it advantageous to mix two collodions together—a practice I should not myself recommend—I have no doubt they would do so without requiring advice on such a simple expedient. As to one manufacturer's collodion giving too much half-tone, and another's giving too little, I will simply say, that to assume this to be the rule is hardly correct; what we each aim at is to produce a perfect article, and though we may adopt slightly different methods of attaining this end, the result is substantially the same; it is therefore quite unnecessary that any of your readers should give themselves the trouble to go to half-a-dozen different makers for the purpose of getting samples to mix together.

I am, Sir,
A Manufacturer of Collodion.

PHO-TOPOGRAPHY.

To the Editor of the "Photographic News."

Sir,—With all diffidence, I venture to suggest that you should acknowledge the receipt of such letters on the above subject as you may receive, and promise us a compact list of the more choice localities; and your readers will listen to the accounts of the rambles of their piscatorial friends—

By the Roding from Chipping Ongar to Barking Creek.

By the Lea from Brockett's Hall to Blackwall, Broxbourne Weir, &c. &c.

By the Brent from Hendon to Brentford.

By the Colne from St. Albans to Staines.

By the Thames at Marlow Bridge, Cliefden, Magna Charta Isle, &c. &c.

By the Mole, on whose banks as the exhibitions show, many nature-loving photographers have been, not uselessly, tempted to linger.

By the Wandle from Croydon to Wandsworth, which supplies more mills, for its length, than any other river.

By the Darent from Westerham to Dartford.

By the Crouch from Orpington to Crouch.

It would be well for photographers to go without their camera to a few of the better known localities, and make their own observations and inquiries. Little can be done after noon; and it would be better—the weather being likely to be favourable, and they somewhat acquainted with the localities—to journey down in the evening, and rise very early. But few places are without early conveyance to London.

Those seeking to photograph plants, should have just a smattering of botany and geology. Beeches and truffles are over chalk; the tusilago on clay (of these many beautiful photographs have been exhibited). Osmunda regalis (a fern) is found on the banks of the Dee, $11\frac{1}{2}$ feet high (S. Murray's British Flora). Felix was, at Hestercomb, near Taunton, so large, that if a grenadier, with cap on, could be carefully let down into the vegetable vase, he would be a formidable vasculum for specimen, but a small camera for faithful representations.

They might look into various books for accounts of old ruins, as Mr. C. Knight's works; Watson's New Botanist Guide for likely places to find the more rare plants; in many works on geology for cliffs, quarries, &c.

Viator.

Miscellaneous.

Latest Foreign Art and Science Intelligence.

The Great Trees of Calavéras, California.—A recent traveller has sent one of the French journals a very graphic description of the above trees, of which we make the following extract:—"California is the land of mineral and vegetable wonders, and at the late exhibition of agricultural produce in San Francisco, were seen vegetables (cabbage, potatoes, &c.) as they were not seen hitherto but on the canvas of fantastic theatrical decorations. It is the valley of Calavéras, situate at the entrance of the Sierra Nevada, where, 1,500 mètres above the level of the sea, those unheard-of giants of the pine tribe are to be met with. One of them, probably the largest tree in the world, *the big tree*, was 95 feet in circumference, and a height of 200 feet. By a strange freak of Vandalism, this tree has been cut down."—The most important feature of the above article is the botanical disquisition as to the systematic name of these huge trees of the Abietenees. They have borne hitherto the following names: *Taxodium sempervirens*, (Lamb.) *Condylocarpus*, (Salisb.) *Sequoia sempervirens*, (Var. Auct.) *Sequoia gigantea*, (Endl.) *Wellingtonia gigantea*, (Lindl.) *Washingtonia*, (Amer.) Mr. Remy, a botanist, writing in the *San Francisco Chronicle*, says that the name of *Sequoia gigantea* is that most properly appertaining to that most interesting tree.

Carthage—Latest Excavations.—M. Beulé, who has distinguished himself by his researches in the Acropolis of Athens, has undertaken, with equal ardour, the exploration of old Carthage, of which, however, little is left, as Scipio burnt it during seventeen days. The ancient city was divided into three districts, the port, the city properly speaking, and the fort, called Byrsa. M. Beulé began his operations at the latter locality, and after much labour on the steepest part of the hill, he found, at the depth of 45 feet of rubbish, the circumvallations of Byrsa. They are built of enormous masses of tuffa, several mètres in size. The faces are jointed and dove-tailed in a rather regular manner, resembling those of the outer surrounding walls of the first temple of Jerusalem, those in several parts of Greece, and even at Fiesole in old Etruscan fortifications. M. Beulé was able fully to study this subject, as he had disinterred a bastion in the form of a tower, 16 feet high. These towers are continuous, presenting outside a simple wall, but arcuated inside. At the depth of three or four feet from the rock, a thick layer of cinders, charcoal, glass, melted metals, charred timber, broken pottery, &c., attest the extent of injury done to this once famous city.

First Introduction of Typography in France.—The following sketch is derived from accurate sources: "When Guttenberg had invented the *new art*, Schöffer printed the books; but it was Faust who, in the capacity of a merchant, brought them first to Paris: they consisted of the *Psalterium* and the Bible. They were printed black and red by one single process, the types being each covered with one of the two inks. He disposed of them as MSS., copied in a peculiar, uniform, and economic manner. For the sake of being more secure, he did not trust to the people of Paris as vendors of the books, but he brought with him persons who were bound to him by an oath. The sale of these books, however, touched much the interests of the copyists of books, clerks, &c., and as they could not understand the way in which they had been produced, and as the rumour of a certain *new invention* had already reached France, they denounced them to the Parliament of Paris as works of the devil. Faust and his assistants were about to be condemned, when Louis XI., who, perhaps, had obtained a glimpse of the process, interfered, and reversed the sentence of the Parliament *ad absurdum*, and told the Sorbonne that he wanted to have a printing press in Paris; on which two members of this body called three of the pupils of Schöffer to Paris: Gering, Grautz, and Friburger. They arrived in Paris in 1470, and were installed with their machine, not without much fuss and uproar, in one of the halls of the Sorbonne. But it was not until the year 1473 that the first, and a very insignificant book was printed in Paris, entitled *Epistolæ Gasparini Pergamensis*. But soon the two members of the Sorbonne (Fichet and Stein) were obliged to leave France, when the poor printers were also discharged, and were obliged to establish an office of their own, Rue St. Jacques, near the church of St. Benoit, in a house, the shield of which consisted of a *golden sun*. This was the first printing office of Paris."

Perpetual Motion.—M. Bourget, professor at Clermont, thus defines perpetual motion:—"To find a reservoir, which, after having received a determined quantity of fluid, should let escape an indefinite amount without being emptied." A very witty saying—still, not quite conclusive.

M. Agassiz and Descriptive and Pictorial Natural History.—This distinguished naturalist, who is now professor at Cambridge United States, where he enjoys an astonishing popularity, has put forth a plan to publish a natural history descriptive of the whole continent of North America. The work to consist of ten volumes text, and a copious atlas of plates. M. Agassiz had calculated that 500 subscribers, at 120 dollars each, would cover the expense. Scarcely, however, was his plan known, than 3,000 subscribers have placed at his disposal the astounding sum of 360,000 dollars. [An experiment hardly to be tried anywhere else now-a-days.]

Plants—according to M. Dubreil, a Belgian horticulturist—may be pushed to an extraordinary size by watering them with a solution of sulphate of iron, 1½ grammes to a litre of water. Fruits, also, will become of a gigantic size if moistened with that fluid. This is to be done when they have arrived at a quarter of their growth, and it is to be done thrice in succession when the rays of the sun have ceased to shine on them (?).

M. NIÈPCE DE ST. VICTOR AND MR. BURNETT.—Since M. Nièpce de St. Victor has published the result of his experiments with the salts of uranium and the different printing processes, which are the result of the application of these experiments, the English journals have, on several occasions, cited the analogous labours of a Mr. Burnett. The priority in the use of salts of uranium in photography belongs, according to them, to this experimentalist, whose name was totally unknown to us until now. In the face of these reclamations, to which we are accustomed, no new invention being announced without giving rise to a host of recriminations of this kind, we judged it advisable to preserve silence. A few days ago Mr. Burnett himself entered the lists, and, in a letter addressed to the *Journal of the London Photographic Society*, he openly attacks, in the most unqualified terms, the good faith of M. Nièpce. This diatribe proves only one thing, which is, that wise as he may be, the writer is ignorant of the most elementary rules of good-breeding. M. Nièpce would certainly not follow his adversary on the ground he has chosen; but, in order to put an end to this polemic, we believe it our duty, in the face of truth, to intervene and ask Mr. Burnett to cite facts in support of his pretensions. Had he, as we are told, made his experiments known previous to our compatriot? In what journal, at what date, and in what terms were they published? The researches we have made in documents we hold in our hands, have been productive of no result. Let Mr. Burnett answer our questions, and we will eagerly do justice to his initiative, while advising him, in future, to be less forward in impugning the good faith of an inquirer, whose reputation has long been established, and who would not, in any case, have been guilty of any other wrong than that of being, like very many others, in ignorance of the labours of an unknown individual.—*La Lumière.*

ABSORBENT PHOTOGRAPHIC POWDER COLOURS.—We have our attention drawn to a new kind of powder colours, which have just been introduced under the above name. From the description of their properties, and from experiments made in our presence, they seem to possess some advantages which it may, perhaps, be useful to point out. They adhere firmly to the glass or paper positive, and also to the silver plate, and with them the artist is enabled to lay tint upon tint until the photograph assumes almost the appearance of a crayon drawing, each successive tint being firmly fixed merely by breathing on the surface of the photograph. The first tints are applied as usual; then, by slightly breathing on the surface, the colour will become fixed, the next tint can then be laid on in the same manner, and so on until the requisite depth of colour is obtained.

Photographic Notes and Queries.

THE PALLADIUM INTENSIFYING PROCESS—TONING WITH PLATINUM.

SIR,—I am surprised that you find the chloride of palladium so exorbitantly dear. I got some the other day here in Bristol in the form of a dark solution, like port wine, containing 25 per cent. of the salt, for 7s. 6d. the oz., which would make the price of the crystals about 30s. per oz. But I am much disappointed as to its intensifying power: it certainly does render the image a beautiful black, and would answer excellently, I should think, for toning transparencies on glass; but how slightly it increases the opacity for actinic rays you can, perhaps, judge from the enclosed stereogram, from a negative which I took hastily yesterday, developed (but not very far) by pyrogallic acid, then fixed and washed it, and lastly *thoroughly blackened* one-half of it by palladium, leaving the other half untouched. I think you will scarcely perceive any difference between them; though by reflected light there is a great contrast of colour. As Mr. Hardwich says, it does seem to give decision and clearness, and perhaps will be useful to finish off a picture. I have tried platinum toning, and shall give it up, from the *excessive* over-printing required. I send you a print, which was much over-printed, but is not dark enough now. It is, as you see, a good black, though Mr. Watt said that he could get nothing but browns.

The fact is, I believe, that by using an *acid* solution you can get very good blacks, but must over-print a good deal: whereas with an alkaline solution, or one containing hypo, the only tints obtainable are browns, but still very rich ones, and suitable for some subjects: in this case, so much over-printing is not required. This is what I have found, but it may possibly be wrong, and the theory of it I cannot explain. I now use always the plain alkaline chloride of gold, as directed by your correspondent "θ"; and I never wish to find a simpler or better process. I warm the solution to about 130°, which materially quickens the operation, and more effectually exhausts the gold; by so doing, I can fully tone, as I have done to-day, at least 200 square inches, with 20 drops of a solution containing but half a grain of chloride to the drachm: and this, in little more than a quarter of an hour. I have found glycerine most useful in keeping the film moist, and enabling me to defer the fixing, and its attendant washings, and, in fact, to do without "a tarnal lot of fixings" in the field, as brother Jonathan would say.

GWENTHLIAN.

P.S.—I would just mention that I have tried the chloride of palladium as a toning agent both with acid and alkaline solutions, and could get no results after an hour's immersion.

BLISTERS IN THE FOTHERGILL PROCESS.

Sir,—I am at present on a visit in the Isle of Man, and have been trying to get some pictures by Fothergill's process. For eighteen months I have worked this process without having a single failure, and now I cannot get a picture worth looking at, excepting by accident.

I have been able to account for my several difficulties after great trouble and many experiments; but I have now met with a trouble which I cannot overcome. I coat the plate, sensitise, wash, coat with the gum preservative, and wash again in three waters at least. In the third water the plates become covered with large clusters of small blisters, perhaps a hundred, in *patches* all over the plate (stereo size). A stream of water poured upon them removes them with the film itself. When dry they disappear as blisters, but their locale is quite distinct, and in development these spots are white and transparent. I have changed the collodion, and tried all kinds. Sometimes I find no blisters occur, and then suddenly I find them again appearing. It may be that the glass is not clean—yet I have used nitric acid solution, alkaline solutions, and the various cleansing solutions recommended, and yet I find my troublesome friends. I use Keene's collodion, and have done so from the first, and always found it first-rate; I cannot think that the fault lies here. Other collodions I have experimentalised with, have served me in the same manner.

As regards exposure, and to show the clearness of the atmosphere in this island, the plates prepared in the same manner as in England require the following exposure in full sunshine and in shade:—

In shade in England	2 minutes.
In sunshine ditto	1½ ditto.
In shade in the Isle of Man	25 seconds.
In sunshine ditto ...	15 to 20 ditto.
Ditto with open portrait lens	3 ditto.

The difference is very great, and well worthy of note. The reflection of light from all sides is so great, that I am obliged to shade the lenses during exposure. The collodion I have referred to is *negative*.

CAPTAIN S. S. B.

Douglas, Isle of Man.

SUBSTITUTE FOR BRASS TUBING.

Sir,—Your "Amateur Mechanic" papers promise exceedingly interesting matter, and must add zest to the continued taking-in of the "PHOTOGRAPHIC NEWS" to many paper photographers, who, like myself, do not yet appreciate its valuable scientific and theoretic articles as they may come to do, and take only a distant interest in collodion practice. Has *papier maché* ever been thought of as a material for cameras and slides? Would it not be very light in weight, and stand the sun well? I have lately used stout saddler's leather, *wetted*, dried round a roller and glued, as a substitute for the ordinary materials for *tubing*. If a ledge was cut half through the thickness of it at one end, before the tube was made, and, after its drying and gluing, the ledge end was re-wetted, a lens could be fitted into the one-edged groove thus formed; the leather being then allowed to dry firmly round it, and having a narrow circular piece of thin leather gummed or glued above, it would be mounted effectually; this first tube should be slid in another tube of leather, directly over it on the roller, with a thin piece of woollen between, to be gummed outside the inner tube, to help sliding, &c. This plan is not so cheap as handy when one has not a turning lathe.

ARTIZAN AMATEUR.

SPLITTING OFF THE FILM.

Sir,—If your correspondent "Reticulus" (vol. ii., p. 203) will adopt the following plan, he will never have any further trouble with his films *creping* or reticulating, or cracking and peeling off, or, indeed, anything of the sort, even when using very contractile collodion.

Make a solution of transparent gelatine—two or three grains to the ounce of water—and filter it whilst hot; keep this by the fire, and pour a little of it over the plate whilst wet, and the plate will dry evenly, and adhere to the glass, even where a tendency to shrink had shown itself in the development of the picture.

It is equally applicable to the wet or dry processes; and the plate can afterwards be varnished as usual.

The same solution will be useful to "Reticulus" (if he be, as he says, "a hard-working photographer") when taking positives for colouring, as it makes the powder colours *bite* into the collodion film beautifully, only requiring the plate to be breathed upon occasionally during the progress of the work.

A picture so coloured does not require to be varnished afterwards.

H. AND J. WALTER.

SUBSTITUTE FOR A GLASS ROOM.

Sir,—I have done my best to imitate Mr. Doubleday's tent (*vide* p. 295, vol. i.), but regret to say that I cannot succeed in taking portraits in it, for various reasons.

If it is placed in the sun, with a southerly aspect, the heat becomes so excessive that I cannot remain in it, the thermometer reaching 94°; if placed in the shade, the exposure becomes too long; I use in it thin curtains, but cannot get light and shade on the face. And, for portability, the tent is made of iron tubing with a flat roof.

It appears so simple that, perhaps, a little assistance will set it going for me. Will it answer if placed in the shade against the sides of a house facing easterly? What aspect has Mr. D.'s tent? Is it in the sun or shade, and does he require and use side and top curtains? So anxious am I to succeed with the tent, that I should much like to see it in use, if Mr. D. would kindly permit such a thing.

B. C. H.

THE FOTHERGILL PROCESS.

Sir,—Seeing in the "News" of May 13th, a challenge from Mr. Draffin to produce a good picture by the Fothergill process in 30 seconds, and likewise letters at different times from many who have failed in working it, I herewith beg to enclose you one of my humble productions, taken by that process in 30 seconds, and which may be some little proof of what could be done in more able hands. I took with me, on the same day, 25 plates prepared by that process, and got 24 as fine negatives as any amateur need wish to take, and not one of them did I expose more than 30 seconds, with a Ross' 4½-inch focus stereo. lens. The plates were prepared with Mr. Keene's collodion, developed according to his formulæ, and kept eight days before exposing. I have scarcely ever had a failure (only through accident) with this process, and think, with due care and proper material, there need never be any fear of arriving at most pleasing results; and, had my health permitted, I should have sent you a few more prints as a further proof. A. F. Stafford.

[The stereogram received is one of the most perfect we have ever seen.—Ed.]

REMOVAL OF SEDIMENT CONSEQUENT UPON DEVELOPING COLLODIO-ALBUMEN PLATES.

Sir,—In answer to Mr. J. Jopling, allow me to state, that after developing a collodio-albumen plate a few days since, on taking it to the daylight I found a sediment formed all over the plate, similar to that which your correspondent complains of; accordingly, I took a small piece of wash-leather and dipped it in water and drew it somewhat roughly over the surface, in order to clean the plate entirely; but, to my surprise, I found that instead of removing the film it merely took away the sediment and left a perfectly clear picture without the slightest trace of a scratch. I have noticed the sediment on many plates, and found the above method of treatment answer in every case.

J. C. Browne.

ANSWERS TO MINOR QUERIES.

Chemicals on a Journey.—*Peregrinator.* You will find it most advantageous to carry as many of the chemicals, &c., as you can in the solid form. We think the most convenient way for you to manage will be to obtain several glass tubes, about four inches long and half an inch internal diameter, made of hard German combustion tubing (to be met with at the operative chemists). These, when sealed up at one end by means of the blow-pipe, and fitted with good corks, will be found far more convenient than glass bottles for holding crystals of nitrate of silver, iodide of potassium, protosulphate of iron, paper packets containing weighed quantities of pyrogallic acid, as well as gun cotton, test papers, marine glue, &c.; as the hard character of the tubing from which they are made, renders them capable of bearing considerable rough usage without breakage; and their shape is such, that they can be tucked away in corners of apparatus without risk, when glass bottles would require special cases for them.

Preparation of Gold Ink.—Gold ink is prepared as follows: take of honey and gold leaf, equal parts; grind them together upon a painter's slab with a muller, until the gold is reduced to the finest possible state of division, and the mass becomes perfectly homogeneous, when it must be agitated with 20 or 30 times its weight of hot water, and then allowed to settle and the water poured off; this process must be repeated with fresh water 2 or 3 times, when the gold must be dried and then mixed up with a little weak gum-water for use.

TO CORRESPONDENTS.

The Stereoscopic Exchange Club.—At the request of several old and new members, we intend shortly to give a complete list of the members of this Club. Additions, corrections, and suggestions are therefore requested to be forwarded without delay.

D. H.—1. You will not find the process you are working give you such clear results as the collodio-albumen or Fothergill process. The stains you speak of may be partially avoided by using perfectly pure water for all the solutions, and adding more acid to the developer; but you will always be liable to meet with them. 2. We hear excellent accounts of it; the enlarging may be effected up to several diameters; in fact, this is only limited by the distance of the sensitive paper from the lens.

E. E. G.—The picture is very inferior. The fault lies more in the printing than in the negative, although a little more vigour would have greatly improved the latter.

E. M. Fix.—Your bath having been in constant use for three years, is now so saturated with organic matter as to be liable to be thrown out of working order on the slightest occasion. Try if a drop or two of nitric acid will remedy it; if that is unsuccessful, make a new bath.

A. G. G.—If you are desirous to take very intense negatives, and your chemicals are in other respects in good working order, you will succeed best by adding a few grains of acetate of soda to your bath. The modification you speak of is well known, and frequently practised.

J. E. G.—In mounting your opera-glass lens for a camera, place the most convex side next the ground glass, and place the stop in front of the lens as far from it as possible, to allow the extent of field required to be covered to be fully illuminated without dark corners. You will not, however, succeed in taking very good pictures with such a lens, as the curvatures are not adapted for giving a flat field.

Capt. R. A.—The albumenised paper is not worth using. You may succeed in painting out the spots, but your best plan will be to burn it all, and get some elsewhere.

S. E. G.—1. Common spring water will do. 2. If you are very careful to clean the dish out perfectly after each operation, the same one will do for all the baths. 3. Liquor ammoniæ of the chemists is what is meant.

Ignoramus [illegible] to remain *ignoramus* on such a subject after what has recently been published in the "Photographic News."

S.—1. Where distilled water is recommended it will not do to use spring water. 2. Not necessarily, although they might injure it. 3. Silver wire should be used.

G. C. W.—There are so many different markings which might come under the designation used, that unless you are more explicit in describing the appearance, we cannot suggest a remedy. We know nothing of the lenses named.

C. S. M.—Our correspondent cannot seriously think that we are bound to answer every inquiry sent to us by return of post.

Aspatria.—The *real* process used in the preparation of both things inquired of, is a secret. Processes have been frequently published professing to enlighten photographers on these points, but they are not trustworthy.

S. S. S.—The negative is very good; perhaps a little more vigour would have improved it. The printing is not so successful.

A. R. Mowbray.—We do not see the advantage to be gained by making your glass room as your friends advise, with the roof sloping from the south end to the north. Construct it as you originally intended; or, if you prefer, have a ridge and furrow roof like the Crystal Palace.

A Novice.—1. There can be no possible illegality in taking a view of a mansion without the owner's consent, if your camera is on the public foot-way. 2. No, it should be washed first, and then quickly dried in a cloth: then it will be fit to use. 3. About 7, 8, or 9 inches, according to the movement allowed by the brass mounting of the lens. 4. About 10 or 12 shillings. 5. No.

Beginner.—We are sorry we cannot offer you much encouragement in disposing of your stereograms. They are very good, and if fairly exhibited in shop windows, might possibly have a certain sale; but the production of stereograms on paper is so easy, and the number in the market is so nearly equal to the demand, that the wholesale price for such would be a sum which would be barely remunerative, unless you intended to embark in their production as a matter of business.

Enthusiastic Beginner.—The information you ask for is of so elementary a description, and the questions show so little acquaintance with the necessary elements of the art, that we cannot do better than advise you to cool your enthusiasm a little by carefully studying the many papers on the subjects which you will find scattered through our two volumes.

N.—Lead will always be liable to corrode. You will find it better and cheaper to have the sink lined with gutta percha or slate.

Harrison.—We will write to the inventor, and if we can obtain further particulars, will publish them. Nothing more is known as yet than what we have given.

J. O. S———n.—1. Your collodion is not suitable for positives. Add a grain of bromide of cadmium to each ounce of it; this will, perhaps, make it work better. 2. Add a 40-grain solution of nitrate of silver to your bath until the effect complained of is removed. 3. The iron tablets will spoil the bath if the glaze has the least flaw in it.

S. R. S.—The precipitate is bromide of potassium.

Embryo Photo.—Employ a single lens of about 20 inches focus and 4 inches aperture, with a shading camera on each side of it; one to hold the small picture drawing out from 20 to 36 inches, and the other, for the magnified picture, of about four times that size. Place the most convex side of the lens next the smallest picture. For the details, consult Mr. Saug's paper in a recent number.

A Lady.—Your progress is very satisfactory, and with perseverance you will be as good a photographer as most persons. You must, however, not object to stained fingers. A lady who is not sufficiently strong-minded to brave public opinion on this point, should not attempt photography. Cyanide of potassium will help you in your difficulty, if gently rubbed on the stains with a little water; but constant application of this powerful agent to the skin is calculated to render your hands rather smooth, and white, and soft; perhaps, however, this would not be looked upon as an objection. They *might* also break out into pimples and sore places, which *would* be objectionable.

A Would-be Member must practise a little more: the subject is totally devoid of interest. The negative is bad—the printing worse, and the pictures are wrongly mounted. Were it not for these trifling defects, we should be most happy to comply with our correspondent's request.

W. L.—As a photograph, it is tolerable; but no one would care about the subject.

J. A.—Your communication is received; in its present form, however, we cannot insert it.

Communications declined with thanks.—Lucky.—Philo Photo.—E. M.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—H. B. Y.—Clock.—Spell.—A. B. C.—Janet.

In Type:—Knostian.—F. W. Evans.—G. R.—E. B.—J. S. Overton.—W. H. B.—An Amateur.—D. C. P—M. A. Root.—G. H. W.—T. Warwick.—B. M. Brackenridge.—J. Walter.—W. L.—D. H.—A. N.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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PARCHMENT-PAPER.

We have often had occasion to remark on the frequency with which discoveries have been made and re-made. The conversion of paper into a substance resembling parchment is the latest instance of the kind with which we are acquainted. The subject is one which is of considerable interest, and as we have not hitherto treated of it in the "Photographic News," and as the priority of its discovery has been contested within the last few weeks, we will give a history of its discovery and of the method of preparing it.

On the 3rd April, 1857, the Rev. J. Barlow delivered a lecture at the Royal Institution, of which the so-called discovery, by Mr. Gaine, was the subject. He showed that a mixture of strong sulphuric acid, diluted with half its bulk of water, and then allowed to cool, was capable of rendering paper, momentarily immersed in it, as tough as parchment. The paper thus altered in its properties was instantly washed in a large quantity of water, and then in a weak ammonia solution; after which it was found that the same paper which before the operation broke under a weight of eight pounds had become capable of sustaining upwards of a hundred pounds. That sulphuric acid possessed the property of converting paper into this substance had been known long previously to the date of Mr. Barlow's lecture, but as the precise strength of the acid was unknown, no use was made of it. It was generally supposed at the time that Mr. Gaine claimed the merit of the discovery, and the publication of a part of the lecture by us in a work which we at that time edited, led to a claim by Mr. Harris in favour of Mr. Henry Beasley's prior discovery and publication of the process; but, in point of fact, Mr. Gaine did not claim the merit of the discovery of the fact of sulphuric acid possessing this property, but simply the exact strength requisite in this substance to perform the operation in a satisfactory manner, he having found by experiment that if the strength of the acid much exceeded or fell short of the specific gravity 1·854, or if it was used in different proportions than two parts of concentrated sulphuric acid to one of water, the result was either to char the paper or convert it into dextrine; the latter result likewise ensuing if the paper were exposed to the action of the acid for too great a length of time. The method adopted by Mr. Gaine, for converting a piece of porous unsized paper into parchment-paper, was merely that of drawing a piece of the paper through the solution described above, and then instantly removing all traces of the acid by washing it in the manner we have already stated; after which the paper was converted into a kind of parchment, so exceedingly tough that a ring of it weighing only 23 grains, and only seven-eighths of an inch in width, was found capable of sustaining a weight of 92 lbs., very nearly double what a piece of animal parchment of equal dimensions would sustain. This parchment-paper absorbs water just as real parchment does, and presents a similar appearance; it feels, after being soaked in water, soft and slippery to the touch, precisely as in the case of skins. In the conversion of the paper or lignine into parchment, or by whatever other name we choose to call the substance which is intermediate between lignine and dextrine, the paper, though diminished in its superficial dimensions, is not increased in weight; thus proving that no sulphuric acid is mechanically retained by it; in this respect differing from the gun-papers of Pelouze and others, and being neither converted into an electric nor rendered more combustible, nor capable of solution in ether or potash. The most striking difference in its nature, as compared with what it was previous to the immersion in the acid solution, is observed when it is steeped in water; in addition to its similarity with animal parchment as regards touch, it is, like that substance, insoluble in water, but, unlike it, is not subject to change from the action of heat and moisture. The chemical theory with respect to this extraordinary action of sulphuric acid on cellulose, supposes that the acid combines with it, in the first instance, with or without the elimination of oxygen and hydrogen as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water.

The uses to which paper so converted can be put are so numerous that we have not space to enumerate them; among the principal, however, we may mention its substitution for animal parchment in the case of policies of assurance, scrip certificates, and legal documents. It might also be used with great advantage in the case of books intended for preservation in the library of the British Museum; and we would suggest to the trustees of that institution, that it might be advisable for them to procure an Act to make it compulsory on the publishers of books to prepare the Museum copy in this way. It would involve hardly any expense, as the sheets, after being printed, could be treated with the acid just as well as before, without any injury resulting to the ink, while the book would be rendered imperishable, and almost indestructible.

Before adverting to the mode in which this discovery may be made available in photography, we must say a little more on the subject of its discovery. We have already observed that Mr. Gaine scarcely claimed the merit of the actual discovery of this property of sulphuric acid, though he did not disclaim it, and even took the precaution of patenting his process. Neither is Mr. Beasley entitled to the merit of a first discovery, though it is possible it may have been made by him independently, for his discovery was published in a work of his in 1852, and possibly some little time previously, as the edition of that year was the second edition of his book; but long before that date, in 1846, the discovery had been made by two French chemists, MM. L. Figuier and Poumarede, who published a memoir on the subject at the commencement of 1847, but which it seems was very little noticed at the time, even in Paris and among scientific men; nevertheless, it is a fact that the discovery was made by them at that time, as Professor Hoffman, who has been engaged in experiments with the process, has felt himself bound to admit, that the extraordinary action of sulphuric acid on cellulose was observed by the gentlemen we have mentioned, long anterior to the date of the publication of Mr. Gaine's experiments in the same direction, and that it is to them that is owing the first discovery of vegetable parchment; and he adds, that the only improvement made in their discovery by Mr. Gaine was the addition of half a volume of water to the monohydrated sulphuric acid used by M. Figuier.

On the occasion of Mr. Barlow delivering the lecture at the Royal Institution, to which we have referred, photographs on this paper were exhibited, Mr. Gaine stating that the peculiarly hard nature of the surface enabled photographers to obtain beautifully rich tones with a much smaller expenditure of nitrate of silver than is usual. The superiority of the print on this vegetable parchment induced us to try experiments with the solution on prints already produced on the paper in its usual condition. We were aware that a less energetic action on bodies was sometimes produced by using strong acids than by using them diluted, and it occurred to us as possible that the strong solution used in parchmentising the print might have no injurious effect on the substance which forms the picture; accordingly, we selected prints which were toned differently, and printed on different kinds of paper, and submitted them to the action of the acid with a result which was considerably better than we had expected. The colour and tint of the pictures was not in the slightest degree changed, and the half-tones remained just as delicate, while the sharpness of the picture was very much increased by the uniform contraction of the paper, and the surface acquired a glossy appearance in some respects superior to albumen, being without that glare which we meet with in albumenised prints, the beauty of the surface being considerably heightened by passing the print between rollers. On removing the prints from the water, after exposure to the action of the acid, the character of the paper was as completely changed as if it had been submitted to the acid before being printed upon. The paper had become so tough that there was not the least danger of tearing it, however roughly it might be handled; and some dirt upon one of the sheets was washed off with soap and water and rubbed dry with a towel, the picture appearing in nowise injured by this rough treatment. For the benefit of those who may desire to try the experiment for themselves, we give the following instructions on the subject. It will be perceived that some slight modifications are introduced, which are rendered necessary by the difference in the paper on which positive pictures are printed.

First take a large shallow pan, and in this place a jug capable of containing about a pint; then measure out 8 fluid ounces of sulphuric acid of the strength given above and pour into the jug, and then add four ounces, by measure, of water, which must be poured into the jug gradually, keeping the mixture stirred during the operation with a glass rod. The amount of heat evolved during the mixing is of course very considerable, and it will be better if it be performed out of doors, in case the heat should break the vessel.

As soon as the mixing is completed, cover over the jug and leave it until cold, when the next series of operations may be begun.

Arrange three clean dishes side by side. No. 1, a porcelain dish about 10 by 12 inches, and Nos. 2 and 3, large and deep, capable of holding about half a gallon each. Pour the mixture of sulphuric acid and water into No. 1, and fill the other two vessels with distilled water, adding to No. 3 a small quantity of ammonia.

Now take the photograph and float it for an instant, picture side downward, on the acid solution in No. 1; taking the same precautions to avoid air bubbles as if the operation were albumenising paper. The picture will curl slightly immediatly after contact with the acid, and its position must be at once reversed, the back of the picture being brought in contact with the solution, and pressed beneath the surface with a glass rod, so that the whole shall be thoroughly immersed; where it must remain for a space of time varying between a quarter of a minute and two minutes, according to the nature of the paper. The conclusions we arrive at in respect to this from the experiments we have had leisure to make are—that Canson's thin paper requires about 30 seconds; Canson's thick paper, 1 minute; thin papier saxe, 20 seconds; Whatman and Turner's, about 10 seconds, supposing the size to have been thoroughly removed, otherwise it will require two minutes to effect the operation. This comparative slowness to be affected in the case of sized paper is not owing to the chemical properties of the size, but simply from its rendering the paper non-absorbent for a time.

When the sheet of paper has soaked for a sufficient time, raise a corner out of the solution, and take hold of it with a piece of folded blotting paper, so as to prevent the acid from coming in contact with the fingers; raise it out of the dish, and hold it over for a second or two to drain. Then immerse it in No. 2, and move it about well, so as to free it as perfectly as possible from the acid. Then transfer it to dish No. 3, that which contains the solution of ammonia, and leave it there for an hour or two, a little time more or less being of no importance; after which it must be well washed, and allowed to dry.

Not more than about half a dozen sheets should be washed in the water in dish No. 2, after which it should be thrown away and replaced by fresh; also in dish No. 3 a piece of blue litmus paper should be placed and allowed to remain, as the slightest trace of acidity in the bath would lead to the destruction of the picture; and whenever any such trace is discovered, a few drops of solution of ammonia should be added and mixed with the water in order to neutralise it. At the same time, it is necessary to guard against any great excess of ammonia, on account of its prejudicial effect on the half tones of the picture.

The appearance of the sheet on removal from the ammonia bath is not very attractive. It presents a crumpled appearance, and requires to be very carefully mounted to render it smooth. The best way of making it assume a satisfactory appearance is to pass it between rollers, the strong pressure it undergoes in this process removing all the creases and rendering it perfectly smooth and glossy; and the advantages of treating photographs in this way will be evident in their increased sharpness.

There is another consideration attached to this process, and that is whether or not proofs treated by it are rendered less liable to fade; and we shall be very happy if some of our readers will put it to the test and inform us of the result for the benefit of the art generally.

[Since the above was in type, a letter has been addressed, by M. Warren de la Rue, to the editor of *Cosmos*, in reply to an article which appeared in that publication speaking in somewhat contemptuous terms of Mr. Gaine's improvements. The tenor of the letter is to point out what we mentioned at the commencement of this article, viz., that Mr. Gaine never claimed the merit of discovering this peculiar action of sulphuric acid, but only how to render it commercially available.]

THE SOLAR SPECTRUM.*

In Sir J. Herschel's paper, already quoted, frequent mention is made of slight variations in the length of the spectra photographed under different circumstances, and with different methods of manipulation. Thus, in some instances, the iodine spectrum was carried down considerably beyond the red rays; in other cases, it hardly extended to the limit of visible colour; and it is, in fact, these remarkable differences of action of the less refrangible rays which form the apparent contradictions mentioned in the article: it being taken for granted that iodide of silver was always affected by rays extending very low down in the spectrum, "degrading in intensity," it is true, "from the blue to the red end," but still sensitive to those rays. Taking the fixed lines, as shown in the above diagram, as our standard, Sir J. Herschel obtains an action upon iodide of silver by rays extending from the highest limit shown in the cut down to the points marked A, B, or C.

Now comes the remarkable discrepancy referred to at the commencement of this article. *Our own experiments have entirely failed to show us the slightest trace of action on iodide of silver by rays lower in the spectrum than the dotted line just below the fixed line G.* We have been working on this subject for several years, with the full consciousness that we ought to find evidence of some action of the lower rays. We have tried and repeated our experiments, with all the modifications which ingenuity could suggest, and still to no purpose. It mattered not what length of exposure we tried, or what modifications we introduced into the various baths and chemicals used; no natural law could be apparently proved on such uniform and indisputable testimony as this, which seemed to limit the iodine spectrum to the rays above this boundary line.

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* Concluded from vol. ii. p. 254.

How ignorant we really are upon the most elementary points of science, when two experimentalists working on the same subject, and with almost the same object in view, arrive at such diametrically opposite conclusions. One states that iodide of silver *is* sensitive to certain rays of light—that it is *always* darkened by them, and produces tangible evidence to bear out the statement. Another states that iodide of silver is *not* sensitive to these rays, and that he has *never* been able to obtain an action by them; and he also brings forward evidence to confirm his statements. Monarchs have gone to war about less important differences than these—scientific men bring their reason to bear upon the matter. Let us see if we cannot solve the difficulty, and show that the discrepancy is only on the surface, after all.

We consider it to be a fundamental axiom in optics that (leaving polarisation out of the question) the refrangibility of a ray of light is absolutely invariable, and that all its other properties depend upon this one attribute. Its angle of refrangibility, or its position in the spectrum with respect to the adjacent fixed lines being given, its optical, thermic, or chemical properties are at once defined, and must always remain, as the necessary and invariable properties of the ray of that refrangibility.

According to this view of the case, then, no variation in the arrangement of the different parts of the apparatus, or of the materials used for refracting the rays of light, could influence the result in one way or another, provided the spectrum was obtained in tolerable purity; neither could a variation in the photographic process employed, or in the order of application of the chemicals, give rise to the discordant results, for we have tried all possible variations of this character without in the least interfering with the uniformity of the results. The only remaining causes of the difference are, the variation of exposure to the light, the difference of its intensity, or variations owing to the development. Our own photographs were taken by the ordinary negative processes on paper or glass, the sensitive iodide of silver being exposed to the action of the spectral rays for a certain period of time, and then being removed, the latent image was developed; the intensity of the light after passing through the extremely narrow slit and then being spread out so as to cover so large a space as was occupied by the spectrum, being too feeble to produce a visible darkening. In Sir J. Herschel's experiments the case was different: the arrangement he used produced a spectrum of the most extraordinary intensity, equalling, if not surpassing, that of undiluted sunlight, and the exposure was prolonged until the iodide of silver actually blackened *per se* without any developing agent being present, or, in fact, needed. To suppose, however, that the difference between our results would be due to the action of the developing agent, would be to assume that iodide of silver would *darken* by exposure to one set of rays, but would *refuse to develop* unless exposed to other rays—a most improbable hypothesis.

The only cause, therefore, that we can imagine for the discrepancies, lies in the differences of exposure. We have stated above, that, from the description of the apparatus which Sir J. Herschel used, we judge the intensity of any particular part of his spectrum to be equal to full sunshine, and the length of time to which his sensitive surfaces were exposed we will assume to be three minutes. We will, therefore, for the sake of comparison, consider the effects which he obtained as being equivalent to an exposure of three minutes to full sunshine.

In our own spectrum the light was admitted through a slit of one inch long and $\frac{1}{200}$th of an inch wide; this was extended by refraction into a band of one inch wide by five inches long; or, the $\frac{1}{200}$th of an inch was stretched out to five inches, and was, consequently, attenuated to $\frac{1}{1000}$th of its original intensity. To this feeble spectrum our plates were exposed, on an average, for three seconds, one-sixtieth part of the time occupied in the other experiments; and when we now remember that the light was only the $\frac{1}{1000}$th part of the intensity of full sunshine, it will make the difference of exposure in the two cases as 1 to 60,000.

We are aware that the above calculation can only be looked upon as a very rough approximation to the truth: we have assumed many things, and set values upon other points, which more exact data would, doubtless, render it necessary to modify; but still, after making every allowance and reduction, the difference in the times of exposure in the two cases cannot fail to be enormous; quite sufficient, we think, to show that the two classes of phenomena under investigation by Sir J. Herschel and ourselves are essentially different, and that arguments and deductions based upon the results of one method of investigation have nothing to do with inferences drawn from the other class of experiments. The plan we are following seems the one most applicable to the present practice of photography. Sir J. Herschel's experiments bear more upon the photography of the future and the elucidation of the grand problem of the fixation of colour.

ECONOMY IN PHOTOGRAPHIC OPERATIONS.

BY ALEXANDER WATT.

In the various processes of the photographic art, all will readily admit there is a great waste of that precious metal—silver; and, probably, photographers who have not turned their attention to the subject, will be surprised when I inform them that when their work is complete and ready to send home to the purchaser, whether it be a paper or glass portrait, a stereogram, or a copy from an engraving, not more than about five per cent. of the silver employed is actually delivered to the customer. There must, therefore, be 95 per cent. (or thereabouts) of the silver used still to account for. Now this is rather a large per centage, and it is, in my opinion, worth any photographer's while to turn his attention to the recovering the same in any way in his power.

I believe many artists have, from the commencement of their operations, allowed the greater part of the silver employed to be wasted, either because they knew not how to recover it, or laboured under the erroneous impression that the waste which occurred in their operations was but insignificant; and when they have been advised to save their washings, &c., they have neglected to do so, because they had not done so from the first! I have had this reply frequently when advising artists to save their waste.

It is true, some photographers save their clippings of sensitised paper, and their old hypo. baths; but when they have done so they know not what to do with them. I have heard that some have collected their old hypo. baths in a large jar, where they have been allowed to settle for some time, when they have poured off the *clear liquor* and saved the muddy sediment which had settled at the bottom, fully expecting that *there* was the silver mine, whereas the precious store was little else but *dirt*—the clear liquor which was thrown away as valueless having carried with it most of the silver! Several old established photographers have acknowledged this when I have conversed with them on the subject.

Again, I believe it to be almost a constant practice amongst operators to develop over a sink, whereby all the silver, in the form of nitrate and iodide, is allowed to disappear with the developing agent, and the minute quantity of silver which is retained by the plate is all that is saved of the comparatively large quantity of silver which was *taken out of the nitrate bath.*

Now when a "whole plate" is removed from the exciting bath, it takes with it but a small quantity of iodide of silver, it is true; but, on the other hand, the back and front of the plate are nearly covered with a solution of nitrate of silver, containing about thirty grains to the ounce of water, and when we bear in mind the amount of surface which has been removed from the bath, I think we shall find that the quantity of nitrate of silver which attaches to it is by no means insignificant—especially if a dozen or so are covered in the course of the day, and so on till the end of the year.

It is the practice with some careful photographers to wipe the back of the plate after its removal from the bath—not to save the silver but to keep the plate-holder dry—and the cloth which rubs the plate may, or may not, be taken care of; but the silver which is on the sensitised surface, as I have before observed, is, during the process of development, suffered to run away down the sink, and is never recovered.

The fixing solution—whether it be the cyanide of potassium or the hyposulphite of soda—has, of course, only the iodide of silver, a small item, to deal with, and this fixing solution, plus whatever silver it may contain, is also, generally, allowed to run down the ruthless sink.

In the processes of toning proofs, we have generally a 60-grain bath to deal with; and here, all will admit, a fearful waste of silver may occur, without great care and economy, in a very short time; especially where the photographer's business lies in printing a great number of copies of various subjects, such as pictures, works of art, stereograms, &c. And I believe, nay, I *know*, that the amount of waste which occurs in some establishments, where the printing and toning processes are carried on, is absolutely alarming, and when I have asserted this as a fact, with a view to render a service to the manufacturer of photographs; from an utter want of chemical knowledge, he has listened with an incredulous ear to the caution, and, I suppose, suffers the loss rather than be proved unacquainted with his business! I know of several establishments where, I believe, they are losing at least many pounds a-week in the way I mention.

But as there are others who may take in good part a friendly suggestion, made by one of some experience in the employment of the precious metals, I will take the liberty of submitting a few hints, which I trust may be found not only practicable, but pecuniarily advantageous to those who believe that "a penny *saved* is a penny gained."

Firstly, when the plate is removed from the nitrate bath, after it has been allowed to drain *into the bath* for an instant, the corner of the plate may be placed upon a pad of blotting-paper, and the back of the plate may now be carefully wiped with a *damp* rag. The blotting-paper, when it has been used pretty often during the day, may be set aside in a box kept for the purpose, and the rag may every now and then be rinsed in a vessel of water, which may always stand ready for the purpose on the operating board. When the blotting-paper pads have accumulated, they may be burned to a black ash to send to the refiner with other similar waste, or be thrown into a vessel of water with the washings of the plate wiper; and, in order to recover the silver from these washings, the paper may be squeezed out, after it has been soaking for some time, and a few pieces of sheet copper and a few drops of nitric acid added to the liquor in which the pads were soaked. In a day or two the whole of the silver which the liquor contained will be thrown down in the form of fine grains of pure metal. The clear supernatant liquor should then be poured off, and the silver precipitate be several times washed with hot water; the precipitate may then be dried or dissolved in nitric acid and water, to make nitrate of silver for the sensitising bath, &c.

After draining the plate as above described, the next item of economy will be in the developing. A pan may be employed over which the operator develops the picture in the usual way, and after the developing agent has been allowed to run off into the pan, the plate may be washed over the sink, since the nitrate of silver, in combination with the developer, is secured in the pan. The cyanide being now poured on, after it has dissolved all the iodide, it is returned to the bottle or jug kept for the purpose, from which the silver may be recovered at any time. When the cyanide is saturated from being long used, by precipitating the silver which it contains with strong sulphuric acid, washing the precipitate as before described; adding a few drops of acid to the mass, and throwing in a piece of zinc, which will convert the precipitate into metallic silver. Again wash as before, and it will be in a condition to dissolve in nitric acid.

The pan which contains the developing waste may be emptied into a larger vessel from time to time, into which a few drops of nitric acid have been poured, and some strips of copper. After a few days the precipitate may be separated from the solution above, and, being dried, it may be fused with a little dry potash in a crucible, or sent in a bulk to the refiner, who will allow, perhaps, half its value, which is better than losing it altogether.

The chief waste being that which occurs in the processes of printing, much greater care is necessary to avoid loss.

When the papers have been floated upon the sensitising bath, they are, of course, allowed to drain for an instant, and it is the general practice, I believe, to attach small pieces of blotting paper to the sensitised sheet, in order to assist the process of draining. These pieces of paper, being saturated with nitrate of silver, when they are done with, may be either *at once* put into a vessel of water to soak out the nitrate as before described, or burned to a black ash to send to the refiner, the former being the most economical. All clippings of sensitised paper, also, before they have been acted upon by light, may be treated in the same way.

Old toning baths may have the silver separated from them by passing a stream of sulphuretted hydrogen through the liquid, which will throw down the black sulphuret of silver. This may be converted into nitrate of silver by boiling in nitric acid and a little water. A piece of copper then immersed in a solution of the nitrate thus formed, will throw down the silver in a pure state, which may again be dissolved by nitric acid to form pure nitrate of silver. Evaporation *and crystallisation* are all that is necessary to render it fit for immediate use.

The clippings of sensitised paper which have *not* been exposed to light, if they are plunged into water, will soon yield the nitrate of silver which they contain, and the silver may be deposited therefrom, as before described, by pieces of metallic copper. The paper now only contains chloride of silver, and the clippings, being removed from the washing bath, should be dried, burnt, and kept for the refiner.

It may, perhaps, be hardly thought worth while to recover the hyposulphite of silver from the washings of proofs which have been removed from the toning bath; but if the proofs are rinsed in a vessel of water kept for the purpose, for an instant, previous to being generally washed, even thus a little saving may occur, which, in the course of a year, where large quantities of proofs are produced, may be worth the trouble.

With respect to the little gold which may remain in the toning baths after they have become inactive, I do not think it will be found worth attention, for I have invariably found, when the toning bath has ceased to give the required tone, that it has been because the gold had been removed by the proofs toned in it, and I am of opinion that what remains is not worth consideration.

I have frequently observed, however, that the toning baths have been carelessly or awkwardly made, and in consequence, part of the chloride of gold has been thrown down in the form of a *brown* powder; when this is the case, if the bath is allowed to settle, the gold may be found at the bottom of the vessel, and should be saved. Sometimes, I believe, the gold is precipitated when the toning bath is made in a very strong light, which should be avoided.

Some photographers keep the chloride of gold dissolved in water for a considerable time before using, so as to have it ready for use; this is a bad plan, as, when a solution of chloride of gold is exposed to light for a time, it will soon decompose, and the gold falls to the bottom or attaches itself to the sides of the bottle.

The above are the principal features of economy to which I would direct the attention of photographers; and if any of the hints which I have thrown out prove serviceable to my fellow-labourers, it will indeed give me infinite pleasure.

I hope shortly to communicate other observations, which, I trust, may not be deemed unacceptable to the readers of the "Photographic News."

METHODS OF ENLARGING PHOTOGRAPHS.

BY MR. DIXON.

Ever since the great discovery by M. Daguerre, the inventive genius of the world has laboured unremittingly, and with varied success, in subduing the difficulties, simplifying the processes, of working and extending this wonderful art to the various useful purposes of life.

The mathematician and mechanic have united their efforts in the production of optical and mechanical apparatus; while the magic hand of the chemist has furnished the means of rendering the light-drawn pictures of nature real and substantial things of life, "as tangible to feeling as to sight."

Do we read a description of cities of far distant countries—of the ruins of Balbec, of Palmyra, of the Pyramids of Egypt, of the ruins of Pompeii—almost instantaneously the wand of the photographer waves over the scenes, and we behold, not a mere picture—a sketch by the hand of the most skilful draughtsman, but we have before us the very impress of the *thing itself;* every rock, and stone, and grain of sand; each crumbling ruin, with all the markings of time; even the very individual leaves of the creeping ivy are placed on exhibition. The living inhabitants of every clime and place, with all their peculiarities and domestic habits, once summoned by this powerful talisman, must appear, not disguised, but *in propriis personis.* Here, the Laplander, drawn by his dogs in a rude sledge on the frozen snow, takes his seat beside the dark-skinned African, who is surrounded by the ever-verdant and luxuriant foliage of the torrid zone; each animal, from every part of the earth, sea, and sky, and the products of every clime and country, may pass, at pleasure, in review before the astonished admirer, as no artist can delineate. History, geography, architecture, mineralogy, and agriculture, are not alone benefited by it; but the embellishments of manufactures in the various arts have received a new impetus, which carries them forward with an *increasing* force; each different branch is being enlarged, and, at the same time, lending its aid to the perfection of the whole. Painting, engraving, lithography, poetry, glass staining, calico printing, and other branches, indicate the progress they have made in a manner not to be mistaken.

I might have mentioned before, that *astronomy* has not been passed by without benefit. Whipple, of Boston, has given to the world a map of the moon, executed by herself, while others have partially succeeded in taking impressions from the fixed stars.

I do not intend to give the *modus operandi* of the various processes, nor to describe the photographic apparatus most in use; but the success of our opticians will be best appreciated by the man of science, who well knows the difficulty of working achromatic lenses of such enormous diameter as 3, 4, and 6 inches, to less than one foot focus; some instruments are even much larger, being not less than 9 inches in clear aperture. The demand for such very large lenses has arisen from the desire for life-size photographs; but the cost of such instruments must necessarily debar many artists of small means from their use; and this having been felt, has awakened the inquiry, "how shall we execute these larger pictures without the means to purchase the larger apparatus?" But even with the *largest* apparatus we cannot produce pictures the size of life; and the special object of this paper is to explain the best means of attaining that end.

The *magic lantern*, once the plaything of our youthful days, was brought out; but the light was found insufficient, and it was returned to its resting-place. The *solar microscope* was then taken up; it supplied the deficiency, and seemed the very thing for the purpose. A negative collodion picture was put in the place of the common slider, and a picture at once was impressed upon the sensitive medium. It required a longer time, of course, to make a picture of such magnified dimensions; but as the object could be kept still for any length of time, that was of little consequence. But the lenses of the common solar microscope being too small, larger ones were substituted, and thus full, life-size pictures were produced from the common size negative on glass. These were put into the hands of the painter, who, now having something to work on besides a blank canvas, was enabled to bring out a more correct likeness, and with greater rapidity, than ever before; still the outline even on this was not perfect, although it answered the ends of the painter better than nothing; and it is in this way the large, full length portraits are made.

We all know that the magnified picture was never well defined. This arose from one of those stubborn laws, well known to the optician, the *inflection* of light, by which a pencil of rays passing near an opaque body is deflected and dispersed. As an illustration, I will suppose that a room be dark, and a small opening in the shutter, through which a very fine pencil of light enters; at a distance from this is placed a white screen, which receives the light, and exhibits a bright spot; but, upon close examination, it will be observed, that the spot is not like a piece of white paper cut out and fixed upon a black ground, but exhibits an indistinct outline, with coloured fringes on each side; and should a wire or thread be now drawn through this beam of light close to the opening, the shadow from it will be far from sharp, but will exhibit a blurred image coloured on each side by fringes in the same manner; and these mixing with the fringes of the circle, give rise to that indistinctness which may be seen on all images thrown on a screen by the solar microscope. Every device that mathematics could suggest, in the configuration of the lenses, have proved ineffectual in correcting this species of imperfection; but, in an apparatus recently devised this difficulty is not encountered. The light is not passed through the picture, and, consequently, near to innumerable opaque bodies, but is *reflected* from the surface, thereby avoiding any interference with the rays in their passage to the tablet or canvas. This apparatus is so arranged, that the sunlight falling on a mirror is reflected and condensed, upon a small daguerreotype or other picture, by which means it is strongly illuminated; directly in front of this is fixed a common small size camera lens, so situated that its axis is at right angles to the plane of the picture, and, being adjustable, a very sharp image is thrown upon the tablet, free from coloured fringes and overlappings.

ON WASHING GUN-COTTON.

BY H. GARBANATI.

Gun-cotton is one of the most uncertain of all photographic chemicals, for though several samples may be made out of the same materials, and apparently under similar circumstances, no two are exactly alike. One of the conditions of good collodion is, that it shall be free from any other matter than that of which it is designedly composed.

I think that enough foreign substance is sometimes obtained in gun-cotton to alter, in some respects, its character. After heavy rains, or even long continued dry weather, when the surface of water is charged with animalculæ, &c., it is impossible to know what may cling to the fibres of the cotton. For instance, let us take the same quantity of water required to thoroughly wash gun-cotton, and filter it through a piece of blotting paper, and we perceive a large quantity of intercepted matter, most of which would have otherwise clung to the cotton, and of course become part of the collodion.

Now this matter, little as it may be, might have an influence on the collodion which we could not take into consideration. It is, therefore, worth while to filter the washing water, since it may be done with no appreciable trouble.

Dictionary of Photography.

Fluorescence (*continued*).—"He was thus led to contemplate the possibility of a change of refrangibility. No sooner had he dwelt in his mind on this supposition, than the mystery respecting the nature of epipolized light vanished; all the parts of the phenomenon fell naturally into their places. So simple did the whole explanation become, when once the fundamental hypothesis was admitted, that he could not help feeling strongly impressed that it would turn out to be true. Its truth or fallacy was a question easily to be decided by experiment; the experiments were performed, and resulted in its complete establishment.

"The lecturer then described what may be regarded as the fundamental experiment. A beam of sunlight was reflected horizontally through a vertical slit into a darkened room, and a pure spectrum was formed in the usual manner, namely, by transmitting the light through a prism at the distance of several feet from the slit, and then through a lens close to the prism. In the actual experiment, two or three prisms were used, to produce a great angular separation of the colours. Instead of a screen, there was placed at the focus of the lens a vessel containing a solution of sulphate of quinine. It was found that the red, orange, &c., in fact, nearly the whole of the visible rays, passed through the fluid as if it had been mere water. But on arriving about the middle of the violet, the path of the rays within the fluid was marked by a sky-blue light, which emanated in all directions from the fluid, as if the medium had been self-luminous. This blue light continued throughout the region of the violet, and far beyond, in the region of the invisible rays. The posterior surface of the luminous portion of the fluid marked the distance to which the incident rays were able to penetrate into the medium before they were exhausted. This distance, which at first exceeded the diameter of the vessel, decreased with great rapidity, so that in the greater part of the invisible region it amounted to only a very small fraction of an inch. The fixed lines of the extreme violet, and of the more refrangible invisible rays, were exhibited by dark planes interrupting the dispersed light. When a small portion of the incident spectrum was isolated, by stopping the rest by a screen, and the corresponding beam of blue dispersed light was refracted sideways by a prism held to the eye, it was found to consist of light having various degrees of refrangibility, with colour corresponding, the more refrangible rays being more abundant than the less refrangible. The nature of epipolized light is now evident; it is nothing but light from which the highly refrangible invisible rays have been withdrawn by transmitting it through a solution of quinine, and does not differ from light from which those rays have been withdrawn by any other means.

"The fundamental experiment, excepting that part of it which relates to the analysis of the dispersed light, was then exhibited by means of the powerful voltaic battery belonging to the Institution, which was applied to the combustion of metals. The rays emanating from the voltaic arc were applied to form a pure spectrum, which was received on a slab of glass coloured by peroxide of uranium, a medium which possesses properties similar to those of a solution of sulphate of quinine in a still more eminent degree.

"The difference of nature of the illumination produced by a change of refrangibility, or 'true internal dispersion,' from that due to the mere scattering of light, may be shown in a very instructive form by placing paper washed with sulphate of quinine, or a screen of similar properties, so as to receive a long narrow horizontal spectrum, and refracting this upwards by a prism held to the eye. Were the luminous band formed on the paper due merely to the scattering of the incident rays, it ought of course to be thrown obliquely upwards; whereas it is actually decomposed by the prism into two bands, one ascending obliquely, and consisting of the usual colours of the spectrum in their natural order, the other running horizontally, and extending far beyond the more refrangible end of the former. Whatever be the screen, the horizontal band is always situated below the oblique, since there appears to be no exception to the law, that when the refrangibility of light is changed in this manner it is *always lowered*.

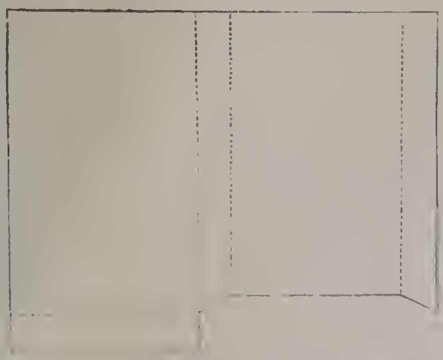
The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

A vertical dipping bath, either for nitrate of silver or developing solution, may be made of gutta percha in two or three ways. It may be formed on a mould, in the same manner as described in a former number for the moulding of dishes. The mould may, in such case, be made of any shape the manipulator may choose; it will be wise, however, to give the front side a slight lateral curve, so that the front of the bath shall be slightly concave inside. The advantage of this will be found in the fact, that if a plate fall forward from the dipper in raising it out of the bath, it will only come in contact at the edges of the plate, and so preserve the film. In forming the joints, after having adapted the plastic material to the form of the mould, it is important that the surfaces to be joined should be perfectly free from moisture. To insure this, and, at the same time, impart a more thoroughly sticky character to the softened gutta percha, the edges may be passed through the flame of a spirit lamp, and then immediately pressed together firmly.

Another method—one by which a great many baths are made for sale—consists in joining the several sides and edges together, each being a separate piece cut out of the sheet. The best plan for an amateur who wishes to adopt this method is to proceed as follows:—Procure a piece of wood the size and shape of the inside of the intended bath; as this is not to be used as a mould, but merely to give a firm block on which to join the pieces together, it need not be smoothed or finished with any especial care. Cut two pieces for front and back, of the requisite size, from a sheet of the proper thickness, and three narrow pieces for the sides and bottom. The side pieces had better be just the width of the thickness of the block, whilst the front and back will be just twice the thickness of the sheet, or a little more, wider than the block, so as to inclose or join over the sides. The piece for the bottom must be twice the thickness of the sheet wider than the thickness of the block, so as to inclose over the front and back. The pieces being all prepared of the proper sizes, take the front and soften one edge in hot water—not more than about half an inch need be softened—and treat the side to be joined to it in the same manner. Then dry the surfaces carefully, and pass one edge of the side piece through the flame of a spirit lamp, and lay it on the edge of the block; now quickly take the front piece, and pass the surface that is to join the edge of the side also through the flame of a spirit lamp, and immediately bring them together, working them into close and firm contact with the finger and thumb; the softened edge of the front piece should be worked round the edge of the side piece so to form a shoulder, and thus give additional strength to the joint. The back should now be treated in the same manner, and then go through the same process with the other side. The bottom piece, as we have said, should be large enough to cover all the other edges; it should be joined in the same manner, and may then be worked round all the edges as we have described for the sides. The use of the block of wood will be found a great aid in keeping the whole firm in the process of joining.

If carefully managed, a very neat bath may be made in this manner. It possesses, however, at all times, the drawback of having eight joined edges, each of which involves more or less risk of parting and leakage. A simpler method, and one which we therefore prefer, is on the principle we recommended as the easiest for making a dish; and this will involve only four points. Cut a piece of sheet gutta percha of the following shape, and the right dimensions:—



This piece, as will be seen, when folded in the direction of the lines, will form a bath; the bottom of the side pieces may be cut at any angle, as the manipulator may choose, such angle, of course, governing the position, vertical or sloping, in which the finished bath will stand. The point of a sharp penknife is to be, by the aid of a straight-edge, run along in the direction of the dotted lines, making a very slight incision: this incision will enable the manipulator to bend the gutta percha to form right angles. There will be one side joint to form, which may be done just in the same manner as in the former method described. The bottom will be joined up in the same manner; and if it be cut a little larger than the back and sides, it may be worked well over the edges whilst soft, so as to strengthen the joint. If necessary or desirable, each edge, where an incision has been made, may be strengthened by the application of a piece of thin gutta percha, which should be neatly pared down at the edges. It is then, as we have before described, to be softened by quickly passing through the flame of a spirit lamp; the edge to which it has to be applied being treated in the same manner, and the two then pressed into contact. A neat bath, sufficiently strong for most purposes, at least in baths of moderate dimensions, is thus very easily and quickly made.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 8th August, 1859.

Every attempt to do away with silver and gold in photographic operations ought to be encouraged. M. Poitevin has lately published a process for obtaining positives without employing any salts of silver. This process is based upon an observation made by M. Niépce de St. Victor, who remarked in his third memoir on "The New Action of Light," that "a sheet of paper imbibed with gallic acid, insolated, and then treated with protosulphate of iron, will give a bluish black image; and that the result would be the same if the operations were reversed."

M. Poitevin's method consists of the following operations:—A dissolution of perchloride of iron (10 parts of perchloride to 100 of water) is mixed with an equal volume of a dissolution of nitrate of uranium (10 parts to 100 of water); and, after having damped one side of a sheet of thin photographic paper, this paper is placed, with the dry side downwards, on a sheet of glass, and the abovenamed mixture poured over it. The sheet of paper is then allowed to dry in a dark place. When dry, it has a dark yellow colour.

When an engraving or a photographic proof is intended to be obtained upon the paper thus prepared, the former is placed before the latter, and the whole exposed for about 15 minutes to the sun. If a photographic proof is employed instead of an engraving, it must be a positive proof, as the parts of the paper prepared as above, which are influenced by light, become white. These white parts result from the transformation of the perchloride of iron on the paper into protochloride, which is not influenced by the gallic acid employed to develop the image. To render the image black, the sheet of paper is again damped as before, by laying in upon water for a few instants, and then applying it to a glass plate, and pouring over it a saturated dissolution of gallic or pyrogallic acid, or even a concentrated infusion of gall-nuts. The parts where the perchloride of iron has not been decomposed by light become, in this operation, of a dark violet colour. To fix the proof, it is sufficient to wash it in water, which is renewed once or twice, to sponge it a little, and to let it dry. The colour of the image becomes more intense on drying.

"The proofs thus obtained," says M. Poitevin, in conclusion, "are as unalterable by atmospheric influences as writing made with ordinary ink." This is certainly not giving a very good guarantee of their durability. The protoxide of iron contained in ink, does not fail, when exposed for some time to the atmosphere, to become red from the formation of peroxide. Black silk hats, whose colour is likewise owing to protoxide of iron, become reddish brown from the same cause, particularly at the sea-side, where the air is pure and acts vigorously. In such cities as London and Glasgow the black carbonaceous matter which almost constantly floats in the atmosphere, must cause considerable injury to the hatter's trade. At Ostend, on the contrary, where a delightful sea-breeze often wafts chloride of sodium through the air, hats and black coats soon become of a reddish tint, and one of the most flourishing shopkeepers in the place is a *marchand de chapeaux*.

The *Bulletin de la Société Française* contains an immense article on "Photographic Processes in Collodion," by a Mr. Migurski, of Odessa. This article is far too long to reproduce here, and I must leave you to judge whether or no it is worthy of insertion in the "Photographic News."

I hear that in Turkey the Grand Sultan himself has composed a photographic album, which is guarded as carefully as the doors of the harem. The fact is, that the principal subjects which adorn this album are proofs of the most beautiful women of the seraglio in the most primitive of all costumes. M. Wittwer has published in *Poggendorff's Annalen* a dissertation upon the action of light upon chlorine water. The author endeavours to prove, contrary to the assertions of Bunsen and Roscoe, that the chemical action of light may be measured with sufficient accuracy by employing an aqueous solution of chlorine gas; and that it is not at all necessary to have recourse to a gaseous mixture of chlorine and hydrogen.

It is, perhaps, well to remind those of your readers who would experiment upon the chemical action of light by means of a gaseous mixture of chlorine and hydrogen, as imagined in the first place by Professor Draper, that very small quantities of this mixture must be employed at a time. A single ray of sunlight will cause a flask containing such a mixture to explode with a loud detonation, whilst the glass is shattered into a thousand pieces!

In these sorts of experiments we have often to deal with a mixture of hydrochloric acid and chlorine, and it is often necessary to be able to determine accurately the relative quantities of these two substances. For this reason, I shall inform you of an elegant method of effecting this, discovered some years ago by Dr. C. J. Kœne, of the Brussels University. Sulphate of potash is transformed, by hydrochloric acid, into bi-sulphate of potash and chloride of potassium; but chlorine has no such action:—

A gaseous mixture, containing hydrochloric acid and chlorine, when passed into a solution of sulphate of potash, leaves the hydrochloric acid in solution as chloride of potassium, whilst all the chlorine may be chased off by a current of air.*

The effects of light upon chlorine water I have already mentioned in one of my former letters, when speaking of the efficacy of this solution in curing wounds from the dissecting knife.

It is interesting to compare this action of light with that of electricity. M. Alfred Riche, of Paris, studied, some months ago, the phenomena that present themselves when an electric current is passed through a solution of chlorine, bromine, or iodine, in distilled water. The galvanic apparatus employed was composed of ten Bunsen's elements, and the gases produced were received in two tubes of equal length. The results obtained are as follow :—

First, the water is decomposed, oxygen is evolved, and hydrogen unites with the chlorine, iodine, or bromine. Exactly the same effect is observed when the solutions of these metalloids are exposed to the action of light or heat.

After a certain time, however, the action of the electric current is completely reversed—oxygen is absorbed, and hydrogen is evolved in abundance. The solution, after the experiment, is very acid, but does not precipitate with salts of silver; the acids it contains are the *oxides* of the metalloïds employed. A solution of potash produces a precipitate when chlorine has been experimented upon, showing that the liquid contains *perchloric acid;* but with bromine and iodine the oxydation never proceeds farther than *bromic* and *iodic* acids. The author's hopes of obtaining, in this manner, *perbromic acid*, were not realised; he believes, however, that the foregoing method of experimentation is the best manner yet known of producing perchloric, bromic, and iodic acids. M. Riche does not say whether *peroxide of hydrogen* or oxygenated water is, or is not, produced in these experiments; but I have heard it said, that this curious combination is formed when a solution of chlorine is exposed to the action of light.

Last Monday, M. Riche presented to the Academy of Sciences at Paris, a paper on the action produced by the electric current emanating from three Bunsen's elements on a mixture of acetone and different acids. When a mixture of acetone $C_6H_6O_2$ and hydrochloric acid is employed, an oily substance is obtained—$C_6H_5O_2Cl$ which is acetone, having one of its equivalents of hydrogen replaced by an equivalent of chlorine. Similar compounds are formed with hydrobromic and hydroiodic acids, though M. Riche is not quite certain about the iodine compound.

$C_6H_5O_2Cl$ is a colourless liquid, very limpid, which irritates the eyes and the nose; its density is 1·14 at 14° (centigrade). The density of its vapour is 3·10. Atmospheric air has no influence upon this compound, and the latter has no action on the litmus paper.

$C_6H_5O_2Br$, the corresponding body formed with bromine, is a colourless liquid, which becomes brown in a few minutes. Its action upon the eyes is so powerful, that it is impossible to remain in a room where a few drops of this substance have fallen upon the floor.

The iodine compound has not been obtained in a separate form.

When the electric current is directed through a mixture composed of acetone 2 parts, water 1 part, and nitric acid 1 part, no oily substance is formed, but the liquid acquires a strong smell of vinegar, and by saturating it with carbonate of potash, evaporating and treating the salt obtained with alcohol, a certain quantity of acetate of potash is extracted. The salt obtained by evaporation (before being acted upon by alcohol) when treated with potash evolves ammonia and methylamine. The presence of ammonia in this case may be explained naturally enough by the union of the nascent hydrogen and nitrogen in the liquid containing nitric acid. But to explain the presence of methylamine, it is necessary to admit that the radical methyle, C_2H_3, exists in acetone, or is produced by the decomposition of the latter.

"This experiment," says M. Riche, in conclusion of his interesting paper, "would appear to confirm the hypothesis expounded formerly by Gerhardt, who considered acetone, $C_6H_6O_2$, as a compound of methyle and acethyle: C_2H_3, $C_4H_3O_2$; aldehyde being an hydrure of acethyle: H, $C_4H_3O_2$.

I must rectify an error contained in my last letter concerning M. Naudin's researches in the plants of the melon tribe. The statement was taken from one of the first scientific papers of Paris, but is completely erroneous. M. Naudin has not described twenty-eight species of melon, but he has shown that the whole twenty-eight species that are at present admitted by botanists must be brought down to ONE SPECIES! He has shown that all the other pretended species are merely varieties, which he has produced artificially, *every one of them*, by crossing or hybridation. Some of these varieties are, however, very permanent.

The French are about to elevate a statue to your countryman, Dr. Jenner, the discoverer of vaccination. The model is exhibited near the *Pont des Arts*. Some of the less informed journalists of Paris are inclined to believe that Dr. Jenner was a Frenchman! They base their assertion on the fact of his having been born at Boulogne-sur-Mer (?). This reminds me of the Irish lady, resident in England, who, having engaged a servant, said to her, "Betsy, you and I are sure to agree, as we are both Irish." "If you please, ma'am, who told you I was Irish?" inquired the maid-of-all-work. "Why, you told me yourself you were born in Dublin," rejoined the mistress. "Lor! ma'am," interrupted Betsy, "if I told you I were born in a stable, would yer take me for a horse?"

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[*] Memoires de Chimie par le Dr. C. J. Kœne, professeur de Chimie et de Toxicologie à l'Université de Bruxelles (Première partie). Bruxelles: P. Larcier, 1856.

THE MANUFACTURE OF COLLODION.

To the Editor of "THE PHOTOGRAPHIC NEWS."

SIR,—Bestowing advice gratuitously is at all times an unthankful task, more especially as among those to whom you give it will be found persons who, either from prejudice, self-conceit, or obstinacy, will not follow your advice, be it good or otherwise.

From the observations of your correspondent, "A Manufacturer of Collodion," the world is led to believe that imperfections and variableness in collodion are utterly out of the question, that the article *must* always be alike—always *good;* an assumption which, I expect, few artists will allow to be founded on fact.

I will now, with your permission, reply in detail to your correspondent's rather extraordinary epistle. In the first place, he says, "It is incorrect to suppose that a superior ether could be prepared by getting samples from different houses and mixing them together," and asks, "What could constitute the superiority of the substance so prepared?" Now, in reply to this, I beg to say that the "Manufacturer" has misread my remarks in this, as in many other instances. I never used the word "superiority" at all: I merely recommended obtaining the ether from "several establishments" in order to "insure *uniformity*" in this article, as it is *sometimes*, I believe, and *not always*, prepared from methylated spirit, and which, I have been informed by some photographers, has caused collodion to exhibit peculiar characteristics. I do not conceive how, by the admixture of various samples of ether, a "vague substance" would result, as it would be quite as easy to ascertain the specific gravity of a mixture as it would that of one sample alone.

In reference to my suggestion respecting the preparation of pyroxyline in lots, and then carefully mixing them together, your correspondent has again entirely misinterpreted and misread my remarks. In recommending that the different batches of pyroxyline should be mixed together, I did so in order that the article should thus be *averaged*, as it is well known that it is nearly impossible to prepare two samples alike. Whether the stock prepared be sufficient for a week's supply or a year's, I conceive that it would be well to mix the whole bulk, so that whatever may be taken from the stock, from time to time, will be an *average* of the whole, or nearly so. Unless this is done, uniformity is out of the question.

"A Manufacturer," &c., also objects to my hints respecting the admixture of the samples of alcohol, and tells us that he gets this article from a wholesale dealer, when he subjects it to "rigorous purification." Well and good. But can he confidently assert that the strength of this article never varies when added to the ether in making the collodion? Is it *always* of the same strength—unvarying as a chronometer? If not, *uniform* results are impossible.

Again, I am told that my precautions about the iodising solution are superfluous, as "we" are perfectly "alive" to the importance of adding a certain amount of iodide to the collodion, and then follows a joke about telling a brewer to add malt to the water to make good beer. And your correspondent seems to think it impossible that a deposit of crystals of iodide can take place in the collodion. Now, this, I assert, is an every-day occurrence, and I can name, at all events, *six* different houses from whom I have procured collodion which has deposited crystals of iodide—some an hour or two after I had bought it—others on the following day, not only on the bottom and sides of the bottle, but also on the *stopper*. I beg to urge that it is not so much the amount of iodide which is added to the collodion that is important, but the amount which *it retains in solution after iodising*. This will depend, of course, upon the conditions of the alcohol and ether as to strength and the temperature at which the iodising took place.

In the concluding paragraph, objection is taken to my having advised photographers to mix several collodions in order to obtain an *average* article. Of course, from obvious reasons, "A Manufacturer of Collodion" could *not* recommend this plan—*that* we can readily understand. But when we are told, that although collodion makers may adopt "slightly (!) different methods, the result is *substantially the same*," I think we may truly express our surprise. There is something more than a *slight* difference between those collodions which are iodised with ammonium or potassium, and those with cadmium; as also between those prepared with pyroxyline and xyloidine, and the results, I maintain, are as widely different from each other as chalk is from Irish bog oak. There are no two collodions alike—not even if made by the same man.

Now, having replied, I think, to the chief points of your correspondent's letter, may I be allowed to offer a few general remarks thereon?

When I offered the suggestions complained of, I did so as much with a view to assist manufacturers, if I could, as the profession generally; and I trusted that any well-meant hint would be accepted in a generous spirit, as I feel convinced it will by manufacturers at large, although there may be a little tendency to self-laudation in one of them; and I may mention that I have given precisely the same hints to several collodion makers, personally, who have all received them with courtesy and approval. It is something quite new for us to be led to suppose that collodion, as it now enters the market, is faultless and needs no improvement; few will cherish this idea, I fancy, for experience teaches us that it is never uniform in quality.

Hardwich, in his admirable "Manual of Photographic Chemistry," says:—"Now, in preparing collodion for photographic purposes, we find that its physical properties are liable to *considerable variation*;" and further, "it often happens in preparing pyroxyline that two portions of nitro-sulphuric acid taken from the same bottle yield products varying in their solubility, although they must necessarily be the same in composition." There is no doubt whatever that this is the case; and, although the resulting compound may in each case be chemically the same, it is quite possible that a collodion which is made with the most soluble form of pyroxyline may differ in its photographic action from that which was prepared with pyroxyline less soluble. I believe that that form of pyroxyline which is the most *attenuated* would form the most sensitive collodion, and *vice versâ*. If this is the case, then, an *average* of each quality being *always* sent into the market, we should have, I doubt not, a more uniform article than that which we can now procure, and this, I am confident, is of great importance to photographers.

Apologising for the length of this communication, and trusting that you will do me the favour of inserting it, I am, Sir, yours obediently, Alexander Watt.

PHOTOGRAPHY IN THE ISLE OF THANET.

To the Editor of the "Photographic News."

Sir,—As I promised to send you a second communication from this place, I avail myself of the opportunities which a day devoted to printing gives me to fulfil my promise. The weather generally since I last wrote has been so favourable that I have had abundant opportunities of testing the relative merits of the collodio-albumen and the Fothergill processes, and I have been working with them indifferently, with varying results. On the whole, however, the balance is in favour of the collodio-albumen. There is a greater amount of depth and intensity in the negatives taken by this process, which compensates for the additional trouble in preparing the plates.

I rather think the publication of my last communication to you may have had the effect of sending some photographers down into this part, for I have seen several cameras in the course of my wanderings about here since, at least one of which has gone the way which neither its maker nor its owner anticipated. I was walking from Margate towards Broadstairs, when I saw a photographer who had planted his camera on the edge of the cliff at Kingsgate, with the object of taking a view of the opposite side of the inlet. The day was very dull and cool, so that I had left my apparatus at home, having no desire to run the risk of getting spoiled negatives, which is the pretty certain result of working with the dry process on such a day; therefore I was quite at leisure to enter into a conversation with him. He told me he had taken a picture of the castle, which, because it was built in an antique style, he imagined must be an ancient place, and talked of getting permission to visit its dungeons, and so forth. I had just finished telling him the story of the old lady who made a similar mistake to his own, and the Margate boatman; how the old lady had burst into raptures at the sight of the castle, and poured a volume of romantic rhapsody into the ears of the unsympathising boatman, and concluded by asking him "How many hundred years old is it?" to which the Charon replied, "Lord, mum, 'taint much older than yourself, for my father helped to build it"—an answer which surprised the old lady in more ways than one.

While I was telling him this he had been holding his watch in his hand, and was in a perfect state of confusion as to what would be the proper amount of exposure. "Half a minute won't be enough on a day like this," he muttered to himself; "I'll give it fifteen seconds more. It is very dull—I may as well let it stay in the minute. They say it is better to over-expose than under-expose—it shall stay in fifteen seconds longer." He was even then in doubt whether it would not be better to let it remain a little longer, when a circumstance occurred which proved beyond question that the exposure had been already too prolonged. He was watching the progress of the hands of his watch, and I was in the act of looking for some stones to exercise my arm by jerking them down on the beech, when I heard a rather loud hollow sound, and looking round I found that the camera had disappeared. It had been planted on the very edge of the cliff, and I have not the least doubt was knocked off with a stone. At all events, when we got down on the beech, we found the camera with one of its sides knocked out by striking against the cliff, and the plate lying in a little pool of sea-water, having buried beneath it an unfortunate little crab, who, in his feeble endeavours to release himself, covered the film with a series of convoluted lines which it would have puzzled even you to account for, if you had been requested to do so by an inquiring correspondent. The worst part of the affair, as regarded pecuniary loss, was from the fact that the concussion had cracked the lens half-way across. Who threw the stone he could not find out. There were a couple of strangers on the cliff at a little distance, but both of them declared that they had thrown no stone, so the unfortunate proprietor of the damaged apparatus had to bear his loss in the best way he could.

In my last letter I alluded to the objects of interest offered by the Isle of Thanet to photographers; and if it is not trespassing too much on your space, I will add a little more to the information I have already given your readers on this point. Among other places, well worth a visit to the photographer, is Minster. This village contains several picturesque cottages, old gable-ended buildings, such as are rapidly crumbling away throughout the land, and which, if for that reason alone, it is advisable should be pictorially recorded by the agency of photography. Buildings like these are best suited for stereoscopic pictures, and all that I took in the village were for the stereoscope. The church is worth taking, both externally and internally, not on account of its surpassing beauty, but from the fact that it is believed to be the oldest church in England, with one exception. It was built by the monks, who formerly had a monastery attached to it, and though it has been a good deal dilapidated by over-zealous individuals, in comparatively recent times, very much has been done in the way of restoring it to its pristine condition within the last few years. Those who may visit this place, and even those who may not, will feel some interest in knowing that the monastery to which it was attached was founded so long ago as A.D. 670. The church was partly burnt down by the Danes, and the nuns scattered about the country, but was subsequently re-built by King Canute, on his return from his pilgrimage to Rome. I believe that if it were generally known that it was in the island in which this church is situate that the first Christian missionaries landed, and that it was from this spot that the Christian religion spread like a wave over the whole of England, much more interest would be felt in visiting it, and in obtaining pictures of objects which have so many interesting associations. We get enthusiastic over a bit of ground where a battle was fought between the Greeks and Romans, but we have no enthusiasm or regard for the scene of an occurrence so commonplace as a battle between the ancient Britons and the Romans. Nearly every part of the Isle of Thanet has been the scene of conflicts between Britons and Romans, and Saxons and Danes; and although I would not expose a plate for the mere sake of getting a picture of an otherwise uninteresting spot, simply because a mound of earth or the remains of a fortification denote that it was once the scene of a bloody battle, yet I find it adds very much to the interest with which a picture of a picturesque farmhouse is regarded, when I am able to point out, in a corner of the print, a mound or fragment of a building, and tell the traditions attached to it. I have not travelled very much in England, but as far as my experience goes there is no county which possesses more interesting subjects of this kind than that from which I date this letter; and I think if this were generally known, many of our London brethren, who now think that good pictures cannot be taken anywhere this side of the Lakes of Cumberland and Westmoreland, or North Wales, would have a desire to visit this part instead, to the great saving of their time and money. For my own part, I am extremely pleased with my visit, which has not been confined entirely to the island itself, but has extended over other parts of Kent, respecting which I may have something to say on a future occasion. E. B.

Broadstairs.

Miscellaneous.

◆

Latest Foreign Art and Science Intelligence.

Photography in Russia.—The late inauguration of the bronze equestrian statue of the Emperor Nicholas, situated as it is in one of the magnificent squares of St. Petersburg, formed by the huge Isaac church and other large buildings, has been a matter of great interest throughout Europe. The statue has been made after the design of Baron Klodt, and has cost 750,000 silver rubles. This festival act has been photographed by M. Richebourg, and a print thereof has appeared in the Paris *Illustration.*

Paris Art Exhibition: Salon of 1859.—We may well say of most of the sites and landscapes of Europe, as far as oil-painting is concerned, "*Omnia jam vulgata;*" and conclude by saying, "*Tentanda est via.*" We must look out for new paths. Thus, M. Belly has gone to Egypt for his subjects, and has exhibited four paintings. One, of great dimensions, is "A wandering Algerian Tribe, passing through the Desert, in search of an Encampment." "The Nile at Sunset" possesses all the charm of clearness of the Eastern sky. At the end of the horizon appears an island overgrown with palms; it is yet lighted by the sun, and contrasts powerfully with the bluish darkness of the river in the foreground. M. Brechère, also, has visited Egypt, and has exhibited several paintings of that country. "The Colossi of Memnon during the Inundation of the Nile," is considered the best of M. Brechère's works, on account of its solemn serenity and quiet. The clearness of the sky reflects pleasingly in the clearness of the water. On the farther banks of the river some fires are lit, and two slender columns of smoke, ascending straight to heaven, attest the perfect quiet of the air. The two Colossi, of sandstone, start up in the midst of the picture, and appear like the guardians of all those temples now in ruins; while their majestic figures have now withstood the changes of *thirty-five centuries!* M. Parini has even gone beyond Egypt, and has exhibited "The Passage of a Caravan across the Defiles which separate Persia from the great Steppes of Khorassan." A great deal of local tint characterises this picture; but there are *none* in Europe, probably, who can attest to its authenticity or truth. But as historical pictures become rare, a series of *new* genres appear. Thus, the painting of animals is largely represented in the Paris *Salon*, and Messrs. P. Rousseau, Troyon, and August Bonheur have exhibited valuable pictures. The portraits (such as they are) appear in the proportion of 866 to 2,045, the latter being the number of articles mentioned in the catalogue. M. Hippolite Flandrin has exhibited the portrait of Mdlle. M., which is considered the gem of the whole exhibition. A French art critic speaks thus on the *delicate* subject of portraits: "In fact, we may, after all, wonder at the even small number of able portrait painters, if we consider the commonplaceness (*banalité*), the want of types, and the little interest which their originals present to them. This observation of commonplaceness follows you in the Salon of the Exhibition, as we could make it every day around us, in pacing through the streets of Paris. We are far from being one of the handsome races on the earth. Thus, for the sake of obtaining a fictitious *character*, many are not satisfied with sitting naturally before the painter; they give themselves a certain air, and assume thus a sort of artificial features."

Paper *v.* Collodion.—With "paper photography," which requires to be left from ten minutes to half an hour in the camera, an over or under exposure of a few minutes is of no importance, while an error of the same number of seconds in collodion is enough to spoil all. Hence it is a positive advantage that the whole process should be completed on the spot, since the cause of failure can be then and there detected and, with the facile manipulation of collodion, at once remedied. To any practical photographer acquainted with the extreme variableness of the actinic forces, this one advantage should decide the question; but it will be found that to persons working at any distance from home, even the supposed superiority in portability is absent; for though not actually employed at the moment of taking the picture, the inevitable bath and chemicals—like "Sinbad's Old Man of the Sea"—must accompany them upon their peregrinations. Then comes the evening with its bother and mess of developing the pictures taken during the day, and preparations for the next—preparations which, if they take place in an inn, can hardly fail to figure conspicuously in the morning's *little* account, no matter how carefully precautions may have been taken to avoid stains. Lastly, when it is considered that the photographer has most probably been on "the tramp" since morning, one can picture a more congenial after-dinner employment than a recurrence to chemistry; nor can we wonder should the tired pedestrian entertain strong views upon "the early closing question."—*Irish Metropolitan Magazine.*

Photographic Notes and Queries.

REMEDY FOR THE MARBLINGS AND WATER-MARKS IN FOTHERGILL'S PROCESS.

Sir,—I have only recently been made acquainted with a modification of the Fothergill process, by which the general complaint of marbling and markings like those of watered silk on the negatives, is entirely obviated. In fact, the improvement is more than a modification, for it pursues a different system, based on different principles. You must not wash the free nitrate from the plate, either with four drachms or any other quantity of water, and the dilute albumen is removed by one washing only with one pint of water, though more may be employed at pleasure. Thus the minute and fastidious nicety so generally prescribed in these respects need no longer trouble those who practise the process.

The principal feature of the improved method consists in this—that after the plate has been sensitised, it is placed on a levelling stand, and the surface covered with a sufficient quantity of white sugar syrup, made by dissolving the best white sugar in distilled water quite hot, in the proportion of one ounce of sugar to one of water. To prevent the sugar crystallising, the solution can be placed on the fire till it boils. It must then be instantly removed, and set aside to cool.

It is important that the surface of the plate should be covered at once with the syrup, and of still greater importance that it should be kept unmoved and undisturbed for at least one minute. After this, tilt the plate so as to move the syrup to and fro six or eight times, then pour off and drain. Syrup which has been used for one plate must not be employed again for another.

Place the plate on the levelling stand after draining, and cover it with half an ounce of the following albumen mixture:—

White of egg	1 ounce.
Liquor Ammoniæ	5 minims.
Distilled water	3 ounces.

Shake up in a bottle, and leave to stand twelve hours, then filter. No frothing necessary.

This should be left on one minute, or while another plate is coated and sensitised. Then move it about the plate, pour off, drain, and finally wash by pouring on the surface one pint of water from a jug—more water may be used, if deemed necessary. Set up the plate to dry in the usual way.

Exposure, the same as in Fothergill's process.

Develop with six parts of the ordinary pyrogallic developer, one grain to the ounce, mixed with one part of a saturated solution of gallic acid in distilled water. To half an ounce of this for a stereo. plate, add three drops of a 30 grain solution of nitrate of silver. If necessary, strengthen with more silver. Fix with hypo. or cyanide.

Such is this new process—simple in its manipulation, and perfect in its results. During the last month, nine batches of plates have been prepared by it, and exposed, without a single failure that could be attributed to the process itself; the negatives being remarkable for their clean and clear appearance, without markings, marblings, or any other defect. The negatives are not so dense as usual, but have a greenish hue, which, in printing, makes up for apparent want of intensity.

There have been so many letters of complaint against the Fothergill process of late in the various photographic journals, that I am induced to send this to you at once, and trust that it will be tried by all those who are dissatisfied with Fothergill's, or other methods. Doubtless, the mode now communicated may be susceptible of improvement, but I give it as I received it, and will only add that the author will shortly publish it in detail, with his name, so that photographers will know to whom they are indebted for this simple but valuable discovery. An Amateur.

STEREOGRAPHY.

Sir,—In taking pictures by the ordinary stereoscopic camera, on plates $6\frac{3}{4} \times 3\frac{1}{4}$, about $\frac{5}{8}$ inch at each end of the plate is left waste.

I wish to know whether, if I have a camera made so that the picture is taken up to the very edge, when the prints are trimmed down to the ordinary stereo. size, the same part of the object will *appear in the centre of the picture*, or whether there will be $\frac{5}{8}$ inch difference?

If, as is now done, the object be focused so that the same part be in the centre of the ground glass, in the two positions of the camera, there would, of course, on trimming, be the difference of $\frac{5}{8}$ inch. The point to be considered, then, is, whether by focusing so that the same point of the image falls on *any other particular point* of the ground glass in the two positions; when trimmed, the picture will be fit for the stereoscope, without *separating the two pictures*; so that the only trimming required is at the ends, and, if so, where on the ground glass are such points?

I presume that, in taking one picture, the point of the object must fall $\frac{5}{8}$ inch to right, and in taking next, $\frac{5}{8}$ inch to left of centre of focusing screen. Is this so?

My object in making the inquiry is this:—I frequently require single pictures for scrap books, albums, &c.

As I take the negative now, the size of these is $2\frac{3}{4} \times 3\frac{1}{4}$, but by the alteration I should get them $3\frac{3}{8} \times 3\frac{1}{4}$, a difference of some importance. This question becomes of more interest to me, as I contemplate getting an enlarging camera, when the extra $\frac{5}{8}$ inch would be very important. D. H.

Pembroke College, Cambridge.

[We presume from the above that our correspondent employs a stereoscopic camera with only one lens, and that the position of the camera is changed for each picture. The lens employed seems also to be capable of covering a rather larger field than is necessary for a stereoscopic slide of the ordinary size, and it is naturally wished to take one, at least, of the twin pictures of the full size the lens will cover. We do not think this can be effected, and the print be suitable for viewing in the stereoscope when trimmed at the edges only (*i.e.*, without diminishing their distance apart by $\frac{5}{8}$ of an inch, or some such quantity), unless the parallelism of the axis of the lens in the two positions is interfered with; and this we think injudicious, as optical errors would be introduced into the pictures. The best plan will be to so arrange the position of the plate when the first picture is taken that the full power of the lens is utilised, and then to take the second picture of no larger a size than is required for stereoscopic purposes, and as near the centre of the plate as will be practicable without encroaching on the first picture. In mounting the resulting prints for the stereoscope, the larger one must be pared down to suit the smaller one. It will be always understood that the larger picture must not encroach so much on the plate that insufficient space is left for the proper taking of the second picture.—Ed.]

THE FOTHERGILL PROCESS.

Sir,—Much diversity of opinion appears to exist among photographers as to the best *dry* process; I have only tried the metagelatine and Fothergill's plan, therefore do not feel qualified to give a *decided* opinion on the "vexed" point, but I would gladly give my experience of a third trial of the latter.

On the first week of last month I prepared six dozen stereo. plates, and on the 18th started on a ten days' photographic tour to Warwickshire, the Wye, &c.,—accompanied by an esteemed friend, who, like myself, is rather an enthusiast in the art.

The weather, during our trip, was "good, bad, and indifferent;" but, notwithstanding, I contrived to expose all the six dozen plates before returning home, and I have just completed the developing of the last, four weeks after exposure.

Out of the lot I have obtained five dozen excellent negatives; and those that have proved failures, have so turned out from over or under exposure, or carelessness in the manipulation. Nevertheless, I do think that a process capable of yielding so many good negatives, under manipulation of an inexperienced hand, may well be considered one of the best, if not *the* best; for, even with the wet process, and manipulated by an experienced photographer, I suspect it rarely happens that more than five dozen good plates out of six can be obtained. A. N.

Highbury New Park.

REMEDY FOR A FOGGY BATH.

Sir,—I constantly see in the "News," and other journals of the kind, inquiries how to recover a silver bath that has acquired fogging properties. I have just recovered a bath from the worst state I have ever seen one in, to give one of the brightest positive pictures that has ever come under my notice. I had been trying experiments, and had used it for gelatine, honey, gum, raspberry syrup, paper, and I hardly know what did not go into it. When I had done, I thought, well, now I will try a collodion plate in it; the result was as might be expected. Scarcely (after a prolonged exposure), on being held up to the light after developing, was any picture visible, and to look down upon its surface it looked like a piece of whity-brown paper laid on the glass rather than collodion; now was the time to try the effect of "sunning." I put it out in the full sunlight for an hour, carried it back to my dark room till the morrow, when I tried it again, and I got a plate not a whit improved; on filtering, I found a large quantity of black precipitate on the paper; I had about three pints of bath, and, of course, did not want to lose it. I then put into it about a small teaspoonful of carbonate of soda, let it stand till the next day, when I filtered it, and added acetic acid for a positive bath, and the result is, as I have before stated, the cleanest and brightest blacks in the shadows I have ever seen.

Thomas Warwick.

PHOTOGRAPHY AND GARDENING.

Sir,—Will any of your scientific readers, who are well up in gardening, kindly inform me (and I think it would be a useful bit of information to many photographers if it were to come through the "News") whether the water from the developing sink—which has in my case a conglomeration of most of the chemicals used in photography—is likely to be injurious or beneficial if used to water a garden? or whether, if thrown in one particular spot, it would injure fruit-trees, vines, or flowers, in the immediate vicinity?

F. W. Evans.

ANSWERS TO MINOR QUERIES.

Feebleness of the Image.—*J. F. S.* This may be caused, according to Mr. Hardwich, by the use of impure nitrate of silver, or the presence of nitric acid in the bath; also by over-exposure in the camera. In hot weather the plate must not be kept too long before dipping, or between sensitising and development, otherwise the film will become partially dry, and a loss of density will result. Another cause of weakness of the image is an improper mode of applying the developer, viz., scattering too large a quantity over the film, so as to wash off the greater part of the nitrate of silver. The density of the negative will also vary much with atmospheric conditions imperfectly understood, the same collodion giving sometimes a weak and sometimes a strong picture.

Strength of the Negative Bath.—*Tapping.* The strength of bath which seems to be universally adopted in England is 30 grains to the ounce. For our own part, we think it might very advantageously be increased to 40 or 45 grains. We have worked with much satisfaction in a bath of this strength; and our American brethren in the art strongly urge the advantage of a 40-grain over a 30-grain bath.

TO CORRESPONDENTS.

J. Morel.—1. A twin lens camera is the one we prefer for general stereoscopic work. 2. No lenses have yet been made, of that kind, small enough for stereoscopic pictures.

H. M. G.—1, 2, 3. We do not recommend the addition of iodine to a silver bath. A few grains of iodide of potassium may be added to a new bath, if it eats away the sensitive film; but this effect soon goes off after preparing a few plates in it. 4. If you send word to our publishers they will forward the missing numbers of the "Photographic News."

J. D.—In order to remedy the red tone of print 1, print deeper, and keep it a longer time in the toning bath; this, provided your chloride of gold is good, will produce darker colours. The absence of half-tone in the face of print 2 is (provided the negative is a good one) caused by the salts of gold and platinum being acid; they should be made alkaline, according to the directions given by Mr. A. Watt and others in recent numbers of the "Photographic News."

A Beginner.—Any good negative collodion will take pictures in less than half a second in sunshine, provided the lens be tolerably quick working, and the chemicals are in good order. The varnish to be used for painted photographs entirely depends upon the kind of colours used, whether powder, oil, or water colours; if you ask at the colour shops, they will recommend you the best kind for your purpose, their preparation being a trade secret. Water colours may be made to adhere to albumenised paper by adding a little prepared ox-gall to the water in which the colour is rubbed.

F. J. B.—1. The yellow stains caused by nitric acid on the fingers cannot be removed except by friction with pumice stone, or other means by which the burnt skin is worn away. 2. We have not yet tried any experiments with the "moulded carbon" filters, but should think that they would do for filtering rain water for photographic purposes.

A Voice Outside.—We cannot imagine any one, who is really desirous of profiting by the paper alluded to, being unable to understand the few mathematical expressions used. You must remember that in studying any science you must learn the *correct language* of that science. It is unfair to our other readers to ask us to translate all our scientific articles into such elementary language as to be understood by those who have not hitherto paid any attention to the subject. Tell us *where* you find a difficulty in comprehending the description, and we will gladly assist you; but so long as your complaint is an indefinite, sweeping one of "can't understand," what can we do?

S. W.—Keep on distilling the water, throwing the product away at first, when an ounce or two comes over, and testing the successive portions with nitrate of silver. The water will gradually come over purer and purer, and when it shows itself quite pure, collect it for use. The impurity of the first portions is caused by the different parts of the apparatus not being perfectly clean when first used.

W. B. R.—If the names and addresses were printed as you suggest, they would occupy more space in our columns than we can afford to give. If, however, we can see a way of getting over the inconvenience you name, we will adopt it.

Enquirer.—All depends upon the materials of which the paint is composed. No injury will be caused by it so long as none of it comes off visibly on to the prints.

Spx.—Employ a single meniscus lens, and after focusing, push it in so as to diminish the focal length by about one-thirtieth of its entire distance. The convex side of the lens must be next the focusing screen.

F. H., Stockwell.—Received.

Old Subscriber, should have been an *old reader* likewise, as he would then have seen that no subject has been more fully treated of in our columns than the methods of recovering silver from various solutions.

Folly.—Turn your lens round, and the imperfections in your pictures will vanish; you have in some way managed to reverse it in the mounting.

A Young One.—We did not give a diagram of the invisible actinic rays, but we propose to do so in a future article specially devoted to the subject.

Wax.—The formulæ given in our last by Mr. Stanley Crawford, will be applicable for work during very hot weather in this climate.

J. C. S.—We are not partial to fixing with cyanide of potassium; it is so energetic a solvent that it is very liable to dissolve some of the picture and produce faint negatives. Quite as much washing is required as when hyposulphite is used.

H. O. W.—The wire should be soldered together at the upper part, so that the metal used as solder may not injure the bath. It would be as well, also, if it were electro-plated at the join.

Colour.—Consult our advertising columns.

S. T. O. R.—The gas was sulphuretted hydrogen, or hydrosulphuric acid: a very deleterious and offensive body. We are not surprised that your family objected to your employing it in the drawing room.

Colla.—If the iodide of silver separates from the plate and floats about the bath in yellow flakes, it is a sign that the collodion is over-iodised. The remedy is obvious.

Old P.—The lens which you have been using is not large enough for such work; it is unfair to the maker to exhibit such pictures as you have sent us, without some explanation.

Communications declined with thanks.—C. S. Y.—Process.—M. W.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—July.—P. Q. R.—W. L. W.—P. R. P.—F. O.

In Type:—M. A. Root.—G. H. W.—J. Walter.—W. L.—W. H. B.—E. Garrod.—I. W. W.—F. Debenham.—J. S. Overton.—G. R.—Knostian.—One in the North.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

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THE TURPENTINE WAXED PAPER PROCESS.

Many inquiries having been made for information on this process, we think that we shall best meet the wishes of our readers, if we lay before them the process which has been largely employed during the past year by our friend the Rev. J. Lawson Sisson. The process itself is founded upon that of M. Tillard, and the following abstract is taken from an excellent little work* on this and similar processes, which the above-named gentleman has written, and illustrated with some of his beautiful waxed paper stereograms.

Dissolve, by moderate heat, one ounce of pure white wax in twenty ounces by weight of the ordinary spirits of turpentine. Let it rest for twelve hours, and then filter. Add carefully, and by degrees, to the filtered liquid, two drachms of pure iodine. The mixture produces ebullition, and is at first of a reddish colour, which shortly changes to that of a weak solution of chloride of gold.

To this preparation next add two ounces by weight of cold-drawn castor-oil. Mix well.

Pour this solution into a flat porcelain dish, scrupulously clean and dry, and in it immerse your negative paper, cut to a convenient size, for three or four minutes, taking care not to place too many sheets at a time in the liquid, and avoiding the formation of air-bubbles.

The paper becomes transparent, and like parchment in tenacity. Remove the paper sheet by sheet, and hang up to dry in the usual way; when dry, place the paper between the leaves of a portfolio, where it will keep well for some time. The liquid will serve until it is exhausted to iodise fresh paper.

Paper thus easily prepared, and sensitised in an aceto-nitrate of silver bath, gives very good results indeed—the negatives being very transparent in the lights, and of an intense black in the sky and the other dark portions; but the time of exposure is as long as with the ordinary wax paper process. By submitting the paper, however, to a second process, as indicated by M. Tillard to the French Photographic Society last year, it is rendered much more sensitive, and is well worth the additional trouble bestowed upon it in iodising it a second time. I have taken a good portrait, in mid-winter, in half a minute with paper thus iodised a second time. Here is the process:—

Serum of milk, 18 fluid ounces; dissolve it in iodide of potassium, 3 drachms; bromide of potassium, 2 scruples; add to the above the whites of 5 eggs, beaten to froth; then beat all the ingredients well together; let the mixture rest for some little time; filter through fine muslin (double) into a flat porcelain dish; plunge sheet upon sheet of the paper, *previously iodised* and *quite dry*, into this second bath, avoiding the smallest bubbles of air between the sheets; leave them in this bath at least 15 minutes—longer iodising does no harm—remove one by one, and pin up to dry, placing a morsel of white blotting paper at the lower corner to hasten the drying; preserve it in a dry place between blotting paper.

Sensitising the paper is the next operation, which must be done by the light of a taper in the dark operating rooms.

The bath is composed thus:—Nitrate of silver, 20 grains; lemon juice, 8 drops; acetic acid, half a drachm; distilled water, 1 ounce; iodide of potassium, half a grain.

A sufficient quantity of this may be made to last some time; it improves with keeping; it must not be exposed at any time to daylight.

M. Tillard plunges his paper into a bath, prepared in the manner stated above, for four minutes. I invariably sensitise it upon a glass plate set level.

Clean the glass thoroughly; set it level; filter on to it a drachm or two (according to the size of the paper) of the aceto-nitrate solution; spread it with a bit of wax paper; place the smoothest side of the paper, which ought to have been marked at first, carefully on the liquid; leave it there until the upper side has almost lost its pinkish-yellow tinge; then reverse the sheet, leaving it in contact with the silver solution for about a minute; remove it by one corner with a pair of horn forceps, and wash it well in rain water for some minutes; you can hardly wash it too much; blot off between two fresh sheets of blotting paper, and pin up until all the sheets you are going to prepare are washed. It is necessary to filter a few drops of fresh aceto-nitrate on to the glass plate between the sensitising of each of the papers, and when all are sensitised, pour off the remaining liquid into a bottle containing a solution of common salt. All the silver falls to the bottom as chloride of silver; and when sufficient is obtained to make it worth while, you can reduce the chloride to the metallic state in the ordinary way. Very little silver is lost, and you have a fresh sensitising solution for every sheet of paper, and there is no need of kaolin or animal black. I prefer this mode very much to the usual one of employing the bath over and over again; but if you prefer using a bath, then you must add some kaolin to preserve the solution clear, otherwise the albumen in the second iodising bath would soon discolour it. The papers are now ready for placing in the dark slides of the camera.

It is impossible to give any positive directions as to the time of exposure in the camera. From some experiments I have lately made, the turpentine paper seems to be at least one-third more sensitive than the ordinary wax paper. As the paper bears, without injury, a prolonged action of the developing bath, it is well to avoid over exposure.

The paper will keep well many hours after exposure in the camera, and before developing. I have developed some negatives the day after, but, although this is sometimes exceedingly convenient, I would by no means recommend it as a rule. I would especially enforce the necessity of having the developing dishes thoroughly clean. Notwithstanding the bad name that cyanide of potassium has got, I always make use of it to clean my dishes and hands. Into a *perfectly clean* dish, then, pour equal portions of saturated solution of gallic acid in rain water, and rain water (it is important not to have the gallic acid stronger than this). Add five or six drops of the sensitising silver solution described above to every four ounces of the bath; the silver solution must not have served for sensitising. I usually let the negatives float on this developing bath, exposed side in contact with it, for a few minutes, until the paper lies flat, and the image has begun to appear. Then, by means of a triangle made of a thin glass rod, push the paper under the solution. There is some little difficulty in keeping the turpentine paper under the solution; its pores are so cemented together by the turpentine and oil, that it is not easily saturated with the solution, and, consequently, will float; it must, therefore, be watched. The glass triangles are excellent tools in photography. The Vicomte Vigier employs them for spreading the sensitising and developing solutions over the paper in the Talbotype process. They are most useful in iodising wax paper; with two of them you can push the paper under the solution with the greatest ease, holding the paper with one of them at one corner, while with the other you chase away every air-bubble by rolling, as it were, the base of the triangle over the length and breadth of the paper.

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* Published by Marion and Co., Regent Street, W.

The development is continued until the sky is intensely black, for the hyposulphite bath and the after waxing much reduce the intensity of the negative. The paper sometimes acquires a dirty yellow colour in the bath; no attention need be paid to that. Some of the best negatives are of this colour; they print as well as the others. Sometimes, when I feared the exposure had not been sufficient, I have tried, and with great success, the following method of development: pour into a flat-bottomed dish just enough of the following solution to cover it:—Distilled water, 1 ounce; pyrogallic acid, 2 grains; aceto-nitrate of silver, 2 drops.

Float the negative until the picture begins to appear; remove it carefully; let it drip for a moment, and then place it on the gallic acid bath as above. When the picture is fully developed, the blacks are beautifully dense. In both cases, when all the details are quite out, and the sky sufficiently dense, wash the picture in common water, changed twice, and then plunge into a freshly made bath of hyposulphite of soda of usual strength, say—Hyposulphite of soda, 1 ounce; rain water, 8 ounces.

Let it remain no longer than is just sufficient to dissolve out all the yellow iodide of silver. After that, wash it well in several changes of water, for two or three hours, at least, and blot off with clean blotting paper, and hang up to dry. When *thoroughly dry*, it is ready for waxing; with the turpentine paper this is very easy, for it instantly imbibes the melted wax. Remove the excess of wax by ironing between some clean sheets of blotting paper, taking especial care that the iron is not too hot. The picture is then finished; and, if ordinary care has been bestowed upon the various operations, the amateur will be rewarded with a splendid negative, having the appearance of a fine Talbotype, rather than that of a wax paper negative.

Remarks on the above process.—It is well to avoid leaving the paper too long on the sensitising solution, as it occasionally gives a spotty appearance to it.

Too much silver in the gallic acid bath injures the negatives, by causing a dingy appearance in the lights. The negative, examined by a magnifying glass, appears covered with little black filaments. This is often seen in wax paper negatives, and would seem to be fibres of the paper, charred, as it were, by too strong a solution of nitrate of silver.

M. Tillard, as well as Sir William Newton, recommends a little camphor to be added to the gallic acid solution. M. Tillard also adds it to the iodised turpentine bath. I am inclined to think it helps to keep the lights clean.

Gutta-percha baths must, on no account, be employed for the turpentine solution, nor for the developing baths.

It is an advantage for the traveller to be able to use a sheet of glass to sensitise the paper upon. The Rev. Mr. Raven recommends the tourist to take with him a second piece of ground focussing glass, in case of accident. This ground glass answers excellently; the solution does not so easily run off; the glass is easily cleaned by washing well, and rubbing dry with "papier Joseph."

For developing, the best dish is a solid glass one; the extra expense is more than repaid by the assurance the photographer feels of having always a dish which he can easily and thoroughly clean, and which cannot imbibe any deleterious agents.

For greater security in changing the papers in the open air, I employ a black cotton-velvet bag, lined with yellow calico, the ends of which have a strong vulcanised india-rubber ring running loosely in a hem, so as to close tight round the wrist. In this I can change either papers or dry collodion plates.

NEW CHEMICAL BALANCE.

BY MR. J. B. COOKE, OF LIVERPOOL.

Our contemporary, the *Mechanics' Magazine*, contains the following description of a new chemical balance. Accurate weighing has been frequently spoken of in our pages as being of such importance to the experimental photographer, that we are induced to extract for the benefit of our readers the following excellent description of this simple piece of apparatus:—

"The balance is an instrument of prime necessity to the exactitude of the results sought for in the operations of the chemist. But it is also a very expensive piece of apparatus, and its delicacy requires it to be guarded with the utmost care from the effects of damp, and the other vapours and fumes incidental to a laboratory. The following is the description of an instrument which has been in constant use for more than a year, and which is at once sensitive, effective, inexpensive, and not liable to injury. It weighs quantities amounting to 2,400 grains with an accuracy unmistakably distinct to the $\frac{1}{100}$th of a grain.

"Though freely exposed to an atmosphere which in twelve hours covers a polished iron surface with rust, and which is often loaded with fumes of hydrosulphuric and other acids, it is now as sensitive as on the day of its construction.

"The materials of which this balance is composed are to be found in every laboratory. Their first cost need not amount to 5s., and they can be put together by the chemist himself in the course of two or three hours, so as to be in perfect working order.

"To those operators whose object is the attainment of accuracy with the smallest expenditure of means, it is hoped that a desideratum is here supplied, although some of the points usually considered essential to a good balance appear to be disregarded.

"The beam is formed of glass tube. A piece of barometer tubing of 12 or 18 inches in length, or even the full length of a barometer tube, if economy of space is not important, may be employed. Another glass tube of about three inches in length, and of diameter and thickness proportioned to the weight it is destined to bear, is attached to the beam tube at right angles, at about the middle point of each. Exactitude in any of these particulars is not essential. The attachment may be made by any convenient means, say by fine iron wire, covered afterwards with sealing-wax melted on to it.

"If a portable balance be desired, a suitable stand must, of course, be provided; but if the instrument be intended to occupy a permanent position, it may be made to work upon an open shelf, and the present description applies to the latter circumstances.

"Two other glass tubes, of about two inches in length, are cemented longitudinally upon the surface of the shelf, parallel to and at a distance of 1½ inches from each other.

"They must be equal to each other in diameter, which must be greater than that of the beam tube, or they must be raised equally to some small distance above the surface of the shelf, so that, when the transverse tube attached to the beam is placed across and upon them, the beam itself, lying between and parallel to them, shall be raised at its centre at least ¼-inch above the shelf. The three small tubes should be selected of good shape and polish.

"By this arrangement the beam, when in equilibrium, is supported upon two points, which, owing to the roundness, smoothness, hardness, and chemical inertness of the material, approximate closely to mathematical points not liable to injury from oxidation or friction. Knife-edges, working upon planes of whatever substance, are not theoretically so perfect in action as the above *points* of support, and it would be difficult with the finest art to make them practically more sensitive.

"A piece of sheet-copper is fastened on to the shelf under the beam near each of its ends. An edge of each piece of copper running transversely to the shelf is turned up at right angles to serve as a support at such a height that when one end of the beam, loaded with its full weight, is resting upon one of them, the other end may be separated from its resting place by about $\frac{1}{20}$th of an inch. If the under-surface of the beam be blackened about these places of support, the separation shows very distinctly against a white surface placed behind.

"The weights, and substances to be weighed, are both applied at the same end of the beam; the other end being compensated by a constant counterpoise; a peculiar form of scale pan is therefore required. It is convenient to have three tiers of pans hung in a pyramidal form at a suitable distance from each other by the same three silk strings. The largest and lowest is destined for the substance to be weighed; the middle one in size and position for the larger weights; and the smallest and uppermost pan contains the weights below 10 grains. This compound scale pan is suspended by a bent wire to a loop formed at one end of a short silk thread, which, passing vertically through a small hole in the shelf, and bisecting the end-section of the beam tube, is cemented with sealing wax on the upper surface of the tube. The thread should lie in a slight notch filed on the upper circumference of the end of the beam, and should hang freely from it, the lower circumference being ground away to prevent contact. The thread must also, of course, be carefully protected against contact with the sides of the opening in the shelf. The better way is to make an opening of about one inch square through the wood, and afterwards to cover over the greater portion by four slips of window-glass crossing each other, and leaving only a small hole in the centre for the thread. If this opening be large, the balance will be affected by currents of air which always occur upwards or downwards in such circumstances. The surface of the shelf between the centre of the beam and that end of it to which the pans are hung is divided into ten equal parts by ink lines; and a platinum rider weighing $\frac{1}{10}$th grain is applied to this arm of the beam, and by traversing over each division marked on the shelf causes the variation of $\frac{1}{100}$th of a grain, and dispenses with the use of weights smaller than $\frac{1}{10}$th grain.

"The sensitiveness of a balance is proportional to the approximation to each other of the centres of suspension and of gravity. In the present instance, the centre of suspension is the central point of the mid-section of the small tube attached to the beam, and since the weights of the beam itself and of the scale pans and their contents, are referred to a point much below this, some provision is required by which the centre of gravity of the whole mass may be considerably raised, and its position nicely regulated. The provision required is found in the mode by which the compensation is applied at the end of the beam destitute of scale-pan.

"On the upper side of the compensation-end of the beam is cemented horizontally, with shellac, a table of window-glass of about 1 inch square surface. On this table again are cemented, by the same means, in vertical juxtaposition, two glass tubes; one about 3 inches high and $\frac{1}{4}$-inch in diameter, the other 1 inch high and $\frac{3}{4}$-inch in diameter. A quantity of dry pure mercury is then poured into the tall tube until the beam, whose scale-pan is loaded with about $\frac{2}{3}$rds the weight which it is destined to carry, is nearly in a state of equilibrium. If the tall tube be sufficiently high and narrow, it will then be found that the centre of gravity has risen above the centre of suspension, as will be evidenced by the setting of the beam at either end indifferently accordingly as it is placed.

"Mercury is now poured gradually into the shorter tube, and after each addition weights are added in the scale-pans to produce equilibrium. By every such addition the centre of gravity will be proportionably lowered, and may be brought with the utmost nicety within any assignable distance from the centre of suspension.

"The adjustment will suffice for the purpose of the balance, when the transference of the rider over one division of the shelf towards the centre of the beam shall raise this end of the beam from its supports, and the replacing of the rider in its former position shall restore the preponderance of the weights, and when on frequent trial this is the invariable result.

"The balance is thus left with an extremely small amount of overpoise. The substance to be weighed is placed in the lowest pan. Weights are removed from the upper pans, and ultimately the rider is moved over the arm towards the centre, to the point at which the beam is first caused permanently to resume its normal position. The sum of the weights removed, together with the number of degrees passed over by the rider reckoned as $\frac{1}{100}$th of a grain, will be the weight required.

"The advantages claimed for this balance are, easy construction, cheapness, non-liability to injury from exposure or rough handling, the whole operation of weighing being confined to one end of the beam without loss of sensitiveness, and the separation of the large from the smaller weights.

" . . . . . . The method of mounting is not inferior in sensitiveness to that of the best constructed instruments; and the limits of its sensitiveness are far from being reached in the specimen above described. As an illustration of this assertion, the following rough experiment is adduced:—The writer constructed a balance, of which the beam was a tube of thick glass 22 inches long, and 1 inch in external diameter, and weighing alone 1$\frac{3}{4}$ pound. The scale-pan was loaded with a weight of 1 pound. The compensation was then readily effected with mercury to such accuracy that the translation of a platinum rider weighing $\frac{1}{10}$th grain along the beam, over a space equal to $\frac{1}{10}$th of the length of the arm, sufficed to change the preponderance in favour of the one arm or the other, according to the direction of its transference. This roughly-formed balance therefore, which, exclusive of the scale-pan, did not occupy two hours in construction and preparation for use, was sensitive to a weight of $\frac{1}{100}$th of a grain, or to $\frac{1}{700000}$th part of the weight to be estimated, and about $\frac{1}{2000000}$th part of the whole weight supported on the fulcrum."

PAPER *v.* COLLODION.

I am glad to see a kind of "revival" as to the practice of some of the paper processes making its appearance in sundry questions and "answers to correspondents" in all the journals connected with our art. It will, doubtless, be looked upon as a question long since decided as to the merits, or rather as it is deemed *inferiority*, of anything in comparison with *wet collodion:* yet, if a man is not totally blinded by prejudice, he must allow the fact, that to work collodion on a trip is almost making a toil of what should be a pleasure, and that if he cannot take his *van* with him, a *tent* requires almost as much assistance, and is often almost useless. But as to beauty—setting aside the question of convenience—the collodion men will say that all must admit their higher claim. Far from it, I reply; in pictures larger than 12 × 10, or, at all events, not less than this size, the texture of the paper gives a boldness and artistic effect, in comparison with which a *large collodion* picture is dead and flat to a degree. I have compared some Welsh scenery taken on collodion with pictures taken on paper, and it is undeniable that the paper work excels the glass in all those points where photography fails as to artistic effects. Not that it can be so stated as to every kind of picture. To be in the highest degree successful with paper the picture should be more what may be called a "study" than a "panorama"—something requiring texture and massive boldness. Bedford's exquisite pictures seem to be chosen with reference to the process he works; sharpness, minuteness, and position are all irreproachable. Turner's calotypes are, however, no less beautiful—his old oaks and cottages are far bolder than anything from collodion; broad shadows, which give a massive look to the trunks and architecture, and a stereoscopic effect which few, very few, collodion pictures have. The difference seems to me to be, that the collodion subjects are intended to be kept in a portfolio, and the large paper productions are far more fit to be framed and hung on the walls.

I know that many will not agree with me in this statement, yet others will deem this none too great praise toward the paper works; and, in support of this opinion, I will but state that in some of our largest exhibitions the prizes have been awarded to pictures taken originally on paper. But what is it, then, asks the novice, that makes the glass processes alone used, or nearly so? The old cry of poor negative paper is then repeated, and some of these difficulties are the following:—Of late there have been many enquiries as to the cause of calotype paper staining on the back. Some have answered, that it is bad manipulation, but this is not so, as some of the most successful operators find this annoying failure so very frequent that they have totally given up this process. Amongst many, I am one who has met with this mischance, and amongst many, I am now changing my process for this cause alone. Perhaps my results from calotype are as *photographically* good as any operator's. I have scores of pictures which very few would be able to distinguish from glass prints, and the half tones are as fine or finer than collodion itself. Has my manipulation, then, failed so suddenly? My belief is this—the new paper has some different preparation of *size* upon it which, in iodizing, is partially dissolved away. Some sheets are, indeed, rendered so tender during development, that they will not bear even their own weight, and are truly reduced to blotting-paper.

As a remedy for this, I tried albumenizing the paper, and this removes much or all of the annoyance; but I always look upon the paper as more doubtful in its keeping and working properties. But ere long I gradually changed my process to the waxed-paper, and I am now using this process only. Paper is easily procured, and the long, troublesome work of *waxing* is reduced to a few minutes' certainty by steeping the sheets in the turpentine-wax mixture usually recommended. The results from this process are very sharp and well brought out in light and shade, and many advantages arise from its use. The sheets keep a week at least, so that if a man goes three or four days' trip to some beautiful ruin, he has no work until he returns; and in certainty nothing exceeds it. Yet there is one difficulty, and that is the *cleanliness* required—it must be utterly irreproachable, else those annoying "marblings" show in developing, and ruin an otherwise beautiful picture.

In this process I think porcelain dishes are almost necessary, as gutta-percha or other substances are so very difficult to keep clean; but, in looking into the prices of these, the operator will be quite cast down by the exorbitant cost of the very large sizes; for months I refused to give this price, and went on working with home-made articles, but a week or ten days since I happened to enter the shop of an agent for a French house, and there, to my delight, I found beautiful dishes—far flatter and better made than any English I had seen—and the price was 5s. 6d. for what I had always been asked from 12s. to 20s., according to the place inquired at. How long will these houses be their own enemies? What is usually termed a "round-of-beef dish," of the common "willow pattern," costs from 1s. to 2s., and this with all the trouble of printing, &c. A photographic dish of the same size without printing, and certainly less troublesome to make, costs from 15s. to 20s. On inquiry, I was told that *flat things were always expensive.* I reply, not one photographic dish in fifty is nearly so flat as the common household dishes. If they are made of a more expensive clay, the difference cannot be so great; and if the quantity required is small, a lower price would remove much of that, and hundreds would be used where such a thing is never seen.

In conclusion, my belief is, that the finest quantity of photographs which could be gathered would be composed of about equal parts of glass and paper productions, and that the last mentioned will one day prove the more useful servant.

Θ

AUSTRALIAN NATURE—AND THE ART OF THE PHOTOGRAPHER.*

Thinking as we do, that photography will be also of especial advantage to descriptive (systematic) natural history, a use yet hardly attempted, we shall apply this axiom first to our present subject. It was Professor Lichtenstein, of Berlin, we think, who, in his travels in the Cape, first gave an engraving of a group of ostriches roaming in the deserts of that country—a sight most characteristic, and as well executed as it could be, except by a first-rate artist, or by the aid of photography. For who else can imitate that originality of nature in all its productions, that great type and character which pervade all works of creation? and, then, men like Redouté, or Francis Bauer, or Audubon, are scarce, as it pays better to paint some unmeaning pageant, than the grandeur and sublimity of nature.

Having mentioned the last-named gentleman (an American, but who had been in England), we have arrived at the *ne plus ultra* of the painters of nature. Speaking from memory, we should say that some of his plates of American birds must be nearly 40 inches long—and of such there are several volumes—and still, this stupendous work appeared merely supported by subscriptions of private individuals in America and in England. It is touching to read, as Mr. Audubon states in his preface, how, travelling in some place or other of the backwoods of America, he obtained—a subscriber! As photographic plates are even now attainable up to the size of 36 inches square, there is scope for more Audubons, and at less expense. Moreover, we have to consider that there is an extensive movement going on for popular instruction and recreation; rich people seem to die only for the purpose of leaving immense sums for popular establishments; museums, town-halls, crystal palaces, botanical gardens are springing up everywhere. And all these places have, at least, their entrance halls, corridors, &c., the walls of which are to be adorned by all that is worthy, fair, and pleasing.

Returning once more to purely Australian subjects, we may remark, that it is the aboriginal *men* of that country who first arrest our attention—the South-Sea negro, the Papuan. They stand at the confines of *animality*, as they are found living in pairs under the rock shelves near Lake Macquarrie. We do not believe that there exists one adequate delineation of this race, of which certain types, belonging to certain localities, are dying out. But here an especial law comes into operation, namely:—not to represent scenes from nature taken at random, but subjects selected with tact and judgment. The Australian aborigines are, perhaps, the most varied and changing of any race we know—they range from the stately, erect, plump, and strong, to the very prototype of a living and walking skeleton. Here, as in most cases, the artist must become a student, and make such a selection as will represent either the Papuan of one or the other district, or a general type of the whole race, so far as accessible to the travelling artist. But in the delineation (reproduction) of the naked or half naked races of men, nothing but heliography will yield any satisfactory result; and it might seem that the bard of Avon had something analogous in view, in writing that splendid and world-known line—

> "To hold, as 'twere, the *mirror* up to Nature."

It is only heliography which will ever produce plates in which the exact proportions of the osseous and muscular parts, the tension or relaxation of the skin, the gloss of the body, and the whole gait *(portamento)* will appear in a manner to afford instruction to the anatomist and ethnographer. By such pictures, also (we mean large plates), the physiognomy of the different tribes of men will be best illustrated, and that axiom be made apparent, that humanity is everywhere fair and handsome.

Passing from man to the higher animals *(mammals)*, we may state that huge whales inhabit the shores of the Australian continent, which, perhaps, the camera may seize whilst roaming on the surface of the ocean; at any rate when, still half alive, they are stranded, even near Sydney Head, of a length of 70 feet. And thus it may be truly said of photography, that we hardly stand at the threshold of its destinies and accomplishments. Seals, also, of great variety *(Otaria Perr.)* are to be met with on the rocks bounding the sea, and add to the picturesque appearance of the scenery. Of quadrupeds, properly speaking, Australia has none very large, at least not to be compared with the giants of Asia or Africa. Still, the kangaroo is an exceedingly interesting animal, not to be met with except in New Holland. If we distinguish mammals into quadrupeds and bimana, the kangaroo may be called a triporous animal, as its immense tail, from 4 to 5 feet long, and of immense strength, serves it as a support in its immense jumps, its fore legs being quite small, and, as it were, rudimentary. Nothing can be imagined more sylvan and characteristic of the country, than to see a flock of such animals in some secluded glen of their wild forests, the biggest (called the *old man*) taking the lead, with ears erect, listening to every noise, even that of a falling leaf. Still, they are not over-shy when approached under the wind, and some fine views may be thus secured by the camera. These animals are so popular here, that they, together with the emu (ostrich), have been made the shieldholders of the coats of arms of the province of New South Wales. Of other quadrupeds, there are hardly any in Australia which would claim the attention of the nature-painter or heliographer in a general point of view.

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* Continued from vol. ii. p. 246.

It is different with the feathered tribe—and it is wonderful to reflect on the diversity of hue and colour some of them exhibit. Finding a *take* of them lying on the ground, one might fancy them a heap of flowers. Thé Australian parrot tribe does not comprehend specimens so large as the South American *Aras;* still the *black* cockatoo, a bird of most grim and lugubrious aspect, and the white and yellow-crested, are of sufficient size to ornament any landscape into which they, especially in large numbers, should be introduced. We have seen, some years ago, a splendid water-colour sketch of a large group of Australian Psittacinæ, made on the spot by Ferdinand Bauer, painter to the Flinders-Brown Expedition, but it has since disappeared under that bane of jobbing in everything, even the highest art works. Although "Gould's Birds of Australia" contain some beautiful plates, yet there is numberless scope left for the collodion process to depict these birds in their natural, wild haunts, surrounded by their native, bizarre localities and scenery. The foregoing observations apply similarly to the two species of ostriches inhabiting Australia, the emu and the cassowary. Depicted as they roam, horselike and proud, over the vast plains of land, they will be also an object of great interest. But the finest bird in the world is probably the Australian *Menura superba*, of the family of the Gallinaceæ, with his tail resembling a huge lyre of Apollo. He is to be found in the glens and gulleys of the wild Blue Mountains west of Sydney—flying and flapping through this primeval thicket! We conclude this notice with the hope that we have stated some facts, as to how the *new* art can be worthily employed in the *new* country.

PHOTOGRAPHIC VISITING CARDS.

The printing of portraits on visiting cards appears to be more commonly practised in Paris than here, at least if we may judge from the following article, which holds a conspicuous position in a recent number of *La Lumière:*—

"The fashion of using photographic visiting cards tends each day to become more general—thanks to the ability which our photographers exhibit in this branch of the art. The public like these charming little portraits, of which they can obtain a hundred for the same sum it would cost them for one large proof. Hence M. E. Delepert has rendered a general service in creating this new branch of photography, for it is, as is no doubt remembered, to this eminent amateur that is owing this clever invention. At present, we have to mention a modification which he has introduced of his primitive idea—a modification by which artists generally will doubtless profit.

"The specimen we have before us at the present moment is composed of a visiting card of the ordinary form and dimensions, bearing the name and address as usual, only above the name, in the place where titled people are sometimes in the habit of having their arms printed, M. Delepert has made the engraver emboss a little frame, inside which the portrait is placed. According to the fancy of the owner of the card and the kind of visit he wishes to pay, it will be easily understood that the expression of the model may be varied to an immense extent."

We presume it is meant that, in paying a visit of condolence, the gentleman might be represented with a lachrymose expression of countenance; in paying a visit to a *sportman*—as the French papers always call a patron of the turf—he would be represented with a cigar in his mouth, and his hat *en tapageur;* while, if he were a photographer and proposed like another wise man of Gotham to go to sea in a bowl, he would, doubtless, represent himself in the position familiar to those who have seen the pictorial illustrations of the voyages of Sinbad at the Polytechnic.

"Morning visits, ceremonial visits, congratulatory, condolatory, return to town, &c. &c., might be expressed photographically under their different forms, and furnish subjects for clever compositions.

"A system of printing which has not yet been employed, and which we heartily recommend to amateurs, is employed by M. Delepert for printing his cards. You get into a carriage with the intention of taking a long drive, or of looking after your business. You drive yourself, as every gentleman ought to do. All this time your servant is sitting with folded arms, which is actually immoral, inasmuch as idleness engenders bad thoughts, which lead to bad actions. Now if, just at the moment you are starting, you put a printing frame into his hands, together with a negative and some sheets of prepared paper, he can, during the journey, profit by the sunshine and the weather to print several proofs without fatiguing or disturbing himself. You thus give a salutary occupation both to his hands and his mind, and develop in him a love of art. Is not this an excellent idea?

"For the rest, M. Delepert, who, in travelling fast and far, has found means of writing many charming pages, full of keen observation, spirit, and humour, knows well how to profit by hours which are generally wasted in a long journey. Thus, his carriage is a laboratory, and he establishes himself so commodiously therein that he prefers it, even when in town, to any other which he has at his disposal. In fact, nothing can be more convenient than a laboratory, the position of which you can vary according to the light, temperature, or kind of work you are engaged upon.

"We have an idea that M. Delepert will allow us, in a future article, to return to the subject of his photographic labours, to give an account of the interesting prints he has taken at the Lariboisière Hospital, which give so exalted an idea of the services which photography may render in its application to medical studies."

Dictionary of Photography.

Fluorescence (*continued*).—"The general appearance some highly 'sensitive' media in the invisible rays then exhibited by means of the flame of sulphur burning in oxygen, a source of these rays which Dr. Faraday, to whose valuable assistance the lecturer was much indebted, had in some preliminary trials found very efficacious. The chief media used were articles made of glass coloured by uranium, and solutions of quinine, of horse-chestnut bark, and of the seeds of the datura stramonium. A tall cylindrical jar filled with water showed nothing remarkable; but when a solution of horse-chestnut bark was poured in, the descending fluid was strongly luminous. The experiment was varied by means of white paper on which words had been written with a pretty strong solution of sulphate of quinine, an alcoholic solution of the seeds of the datura stramonium, and a purified aqueous solution of horse-chestnut bark. By gas-light the letters were invisible; but by the sulphur light, especially when it had been transmitted through a blue glass, which transmits a much larger proportion of the invisible than of the visible rays, the letters appeared luminous, on a comparatively dark ground. A glass vessel containing a thin sheet of a very weak solution of chromate of potash allowed the letters to be seen as well, or very nearly as well as before, when it was interposed between the eye and the paper; but when it was interposed between the flame and the paper the letters wholly disappeared—the medium being opaque with respect to the rays which caused the letters to be luminous, but transparent with respect to the rays which they emitted.

"It was then remarked what facilities are thus afforded for the study of the invisible rays. When a pure spectrum is once formed, it is as easy to determine the mode of absorption of an absorbing medium with respect to the invisible, as with respect to the visible rays. It is sufficient to interpose the medium in the path of the incident rays, and to notice the effect. Again, the effect of various flames and other sources of light on solutions of quinine, and on similar media, indicates the richness or poverty of those sources with respect to the highly refrangible invisible rays. Thus, the flames of alcohol, of hydrogen, &c., of which the illuminating power is so feeble, were found to be very rich in invisible rays. This was still more the case with a small electric spark, while the spark from a Leyden jar was found to abound in rays of excessively high refrangibility. These highly refrangible rays were stopped by glass, but passed freely through quartz. These results, and others leading to the same conclusion, had induced the lecturer to order a complete train of quartz. A considerable portion of this was finished before the end of last August, and was applied to the examination of the solar spectrum. A spectrum was then obtained extending beyond the visible spectrum, that is, beyond the extreme violet, to a distance at least double that of the formerly known chemical spectrum. This new region was filled with fixed lines like the regions previously known.

"But a spectrum far surpassing this was obtained with the powerful electrical apparatus belonging to the Institution. The voltaic arc from metallic points furnished a spectrum no less than *six or eight times* as long as the visible spectrum. This was, in fact, the spectrum which had already been exhibited in connection with the fundamental experiment. The prisms and lens which the lecturer had been employing in forming the spectrum were actually made of quartz. The spectrum thus obtained was filled from end to end with bright bands. When a piece of glass was interposed in the path of the incident rays, the length of the spectrum was reduced to a small fraction of what it had been, all the more refracted part being cut away. A strong discharge of a Leyden jar had been found to give a spectrum at least as long as the former, but not, like it, consisting of nothing but isolated bright bands.

"The lecturer then explained the grounds on which he concluded that the end of the solar spectrum on the more refrangible side had actually been reached, no obstacle existing to the exhibition of rays still more refrangible, if such were present. He stated also that during the winter, even when the sun shone clearly, it was not possible to see so far as before. As spring advanced he found the light continually improving, but still he was not able to see so far as he had seen at the end of August. It was plain that the earth's atmosphere was by no means transparent with respect to the most refrangible of the rays belonging to the solar spectrum.

"In conclusion, there was exhibited the effect of the invisible rays coming from a succession of sparks from the prime conductor of a large electrifying machine, in illuminating a slab of glass coloured by uranium."

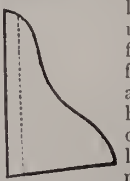
(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—(*continued*).

The gutta percha bath may be supported in its vertical or slightly inclined position, in two ways. A piece of wood may be cemented by means of gutta percha solution or marine glue to the back of the bath, about one-third from the top. To this another piece of wood, sufficiently long to reach to the bottom of the bath, is connected with hinges—a piece of leather will serve the purpose, if brass hinges are not at hand. The amount of inclination at which the bath shall stand is easily regulated by the position of this support; but to prevent it slipping out too far, and endangering the contents of the bath, it is a good plan to connect it to the bath with a band which allows sufficient play and no more. This is easily done by piercing a hole near the bottom of the wooden support, and putting through it a ligature of gutta percha, with a knot or button at one end to prevent it slipping through the hole; the other end will easily be cemented, by heat, to the bath. This method has the additional advantage of affording a stay to the bath, and preventing it from bulging out, as some of our correspondents have complained their baths have done. To afford this stay, the piece cemented to the bath must, of course, be the full width, or it will be likely to cause bulging instead of preventing it.

Another method of supporting the bath, is by means of brackets of gutta percha attached to the back of it. Two pieces of gutta percha must be cut in shape, something like the following. If the angle formed by the side and base of the bracket be a right angle, the bath will stand quite upright; in order to obtain the desired inclination from a vertical position, the side and base must form an acute angle. As a means of slightly altering the position in this respect, at will, a hinge may be formed in the brackets by cutting out a small strip in the direction of the dotted line, making a V shaped grove. By this means the brackets, which are cemented to the back, may be bent inwards towards the centre, and so increase the inclination of the bath at pleasure.



The inside of the finished bath may, as we have before said, be treated with the shellac varnish, if the operator desire. But a more effectual and satisfactory method of protecting the surface will be found in lining it with glass. This may be done without much difficulty, if care and accuracy be used in cutting the pieces for their respective positions. A description of the method of doing this would, perhaps, more properly come under a future head of working in glass; but to make the subject of gutta baths more complete, we will give it here.

Procure plate glass of tolerable thickness—it need not exceed one-eighth of an inch. First cut a strip exactly the size of the inside of the bottom of the bath, and slightly cement it in its place. Marine glue, shellac, or almost any similar cement, will do, as it is rather by mechanical pressure than by cement that each piece is intended to be held in its place. Strips accurately fitting each side are then to be cemented into their places in a similar manner. This done, pieces cut with equal accuracy for the front and back, are to be cemented each to its place. It will be seen now, that the pieces at front and back support the side pieces in position, independent of the cement, and if they have been cut with accuracy, and, still better, if the edges have been ground perfectly true, very excellent joints without cement are formed. Those who prefer it, can easily make certain of the joints by applying shellac varnish to each with a brush. The front and back are still, however, left without any support but the cement. Two more strips for the sides are to be cut narrower than the side pieces already cemented by just twice the thickness of the glass; these will fit in between the front and back, and support each in its position. These last side pieces are the only parts of the glass that depend chiefly on the cement for retaining their position, and must, therefore, be cemented with greater care than the rest. A very simple and inexpensive method of preventing all chance of injurious contact between the nitrate of silver solution and gutta percha is thus effected.

A very excellent method of protecting glass baths from breakage, either for the operating-room or travelling, has been suggested, by encasing them in gutta percha. This is easily done by softening the sheet in hot water, and wrapping it round the bath, joining it as we have before described. The contraction in cooling will make it fit, as though it were part of the bath. The sheet for this purpose should be thin—one-eighth of an inch being quite thick enough. If the gutta percha were very thick and the glass thin, the contraction of the former might crack the glass instead of protecting it. The advantage of this wrapping is twofold: in the first place, it protects the glass materially from the chance of breakage; and, in the next place, it saves the contents without injury, even in case of the "smash" that will occasionally lend zest to the efforts of the photographic tourist.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 14th August, 1859.

An amateur photographer, M. Siard, has addressed to *Le Cosmos* a letter, which I give here in the writer's own words:—

"Whilst waiting the other day at Aulnoye, a small station on the North Railway, I observed a phenomenon which I never saw described. On the ceiling of the waiting-room, formed simply of painted boards, I observed a series of white lines traced in a very regular manner on the black dust that adhered to the ceiling, and particularly just above the lamp which lights the room, and which deposits a certain quantity of soot, rendering the white lines in question very visible.

"I went out to see what part of the roof of the waiting-room corresponded to these white lines, and found that the latter coincided with the edges of the wooden beams, which united, horizontally, the sheets of zinc composing the roof.

"Is it, then, by virtue of a galvanic action that the coal dust is condensed exactly where the zinc is in contact with the wood, and which is interrupted where the metal is not in contact with the ceiling? Or, is the phenomenon in question to be attributed to the mechanical action produced by the constant shaking of the little edifice by the passing trains?

"The cause once known, would it not be useful in the production of carbon positives? Such are the questions which I propose to study."

I have frequently observed the white stripes of which M. Siard speaks. I believe they are common enough in the waiting-rooms of most railway stations, for I have seen them in France, in Belgium, in England, &c., and I feel convinced that they are produced in the following manner:—The dust accumulates, or is condensed equally over the whole ceiling in the first place, but the shaking produced by one or two trains is sufficient to make this dust drop from the places on the ceiling which correspond to the wooden beams, the latter vibrating far more than the walls or the plaster, &c. which forms the rest of the ceiling.

But I can tell you of another phenomenon, somewhat similar, which I happened to observe some time ago in Paris. I had, at that period, a study in the *Quartier Latin*, where I used to sit and write very late at night. In this study was a porcelain stove, which burnt wood (principally *elm*), and the observation I am about to record was made during the winter. One night I worked later than usual; the fire in the stove was kept up the whole time, and I sat writing and smoking till after three o'clock, when I retired to bed. You may imagine my surprise on rising, about 10 or 11, to find everything in the study covered with a dark-brown coating of organic matter, having a faint odour of creosote, whilst the same odour was perceptible in the air of the apartment. This coating was certainly very slight, as to the *quantity of matter* deposited, but the colour was very intense and completely unalterable by chemical means. Where one book lay over another, the outline of the former was *indelibly printed* upon the latter; in the same way the images of bottles, pieces of money, stones, &c. which lay upon some writing paper, were indelibly stamped upon the latter. The paper was darkened everywhere except in those places where it was protected by some other body covering it. The image of this body was, therefore, produced in white upon a dark ground.

When the Duc de Luynes' prize was offered, I thought of the phenomenon I have just described, but I had no time nor inclination to endeavour to find out, by experiment, how these images were produced, and, at the present time, I am completely ignorant as to their cause, though, from the smell of creosote in the chamber, I am inclined to attribute them to the elm-wood burnt in the *calorifère*, and not to the smoke of the tobacco-pipe; moreover, I think they must have made their appearance with the first rays of the morning sun.

Two organic substances, which are comparatively little known, are peculiarly modified by the action of light. The first is *santonine*, a white, crystalline substance, extracted from a plant of our climate, *artemisia santonica;* this substance becomes of a brilliant yellow colour when exposed for some time to the solar rays. The other is the blue colouring matter of wines, *œnocyanine*. According to some observations published in M. Maumené's large work on wine, which appeared last year, this blue principle is modified rapidly when exposed to the sun in *white* bottles; it is very little altered, however, in *green* bottles, and preserves its composition and primitive aspect completely when inclosed in bottles of a *blue* colour.

I will now inform you of some curious observations that M. Bérard has lately made concerning the action of light on animals. It appears from his experiments, that differently coloured lights, or, in other terms, the different rays of the solar spectrum, have a very different influence on the development of young animals, on the hatching of eggs of insects, &c.

A great number of philosophers, from the time of Ingenhousz and Priestley down to the present day, have studied the influence of light on vegetables, but very few have hitherto paid attention to its action on animal organisation. Thus, whilst Priestley, Ingenhousz, Sennebier, De Candolle, Carradori, Knight, Payer, Macaire, and some others, made manifest the action of light upon vegetable respiration, absorption, exhalation—in a word, upon the phenomena of nutrition and development in plants—Edwards and Morren were almost the only observers who studied animal life from the same point of view.

Edwards has endeavoured to show that, without light, the eggs of frogs cannot be developed, and that the metamorphosis of tadpoles into frogs cannot take place in absolute darkness; so that, without the influence of light, a tadpole could never become a frog.

Again, Moleschott has shown that the respiration of frogs is most active in the day time, and diminishes considerably during the night. Morren, the formerly distinguished professor of botany in the University of Liège, observed some years ago that the *infusoria* of our stagnant waters evolve oxygen while basking in the sunbeams. The fact seems to have been since confirmed by Wöhler.

Dr. Hannon, professor of botany in the University of Brussels, thinks, however, that this oxygen evolved by infusoria during the day must be attributed to globules of *chlorophyle* (the green colouring matter of leaves and aquatic plants) swallowed by these animalculæ.

The experiments of M. Bérard are simple enough. Taking a certain quantity of eggs of the common bluebottle fly (*musca carnaria, L.*), he divided them into separate groups and hatched them under differently coloured glass jars. In four or five days the *larvæ* produced were examined, and it was found that those born from the eggs which were placed under the *blue* and *violet* coloured jars, were far more robust, or more fully developed, than the others. The grubs born under the *green* jar were the least developed. After the larvæ of the blue and violet jars, come next in strength and development those hatched under the influence of *red* light; then those under the *yellow* and *white* (or transparent) jars; and, finally, those of the *green*.

The series, beginning at the coloured light most favourable to the development of these eggs or larvæ, may be thus set down:—*Violet*, *blue*, *red*, *yellow*, *white*, and *green*.

The grubs developed in a given time in violet light were more than three times as large as those which were born and bred in green light.

No difference was observed in any physiological function when birds or mice were placed under the same coloured jars; their respiration, for instance, was found to be exactly the same in these circumstances as if they had been placed in ordinary day-light.

The author explains this by supposing that light cannot come into immediate contact with the bodies of these animals on account of their feathery and hairy coverings. Frogs, on the contrary, animals in whom cutaneous respiration is very perceptible, give different results:—

A given weight of frogs living entirely in *green* light evolve far more carbonic acid in a given time than the same weight of frogs under the influence of *red* light. If the frogs are deprived of their skin the result is precisely the reverse.

Last Monday, M. Leroux, tutor at the *Ecole Polytechnique*, deposited at the Paris Academy of Sciences a sealed packet containing an account of some new and curious effects of light. I shall wait with impatience the opening of this packet.

It appears from accounts sent to Paris from Rome by M. Secchi, director of the Roman Observatory, that the month of July of this year was remarkable at Rome, as at Paris, for the abnormal degree of heat that reigned during that period. At Paris we had frequently south-winds, and the excessive temperature was generally attributed to their influence; but at Rome it appears that north-winds have been most prevalent. M. Secchi endeavours, therefore, to explain the phenomenon otherwise, and asks whether it is not connected with a greater activity than usual on the surface of the sun? He observed that during the period of heat the number of solar spots was at its maximum; and it is not the first time that an excessive heat has coincided with this *maximum-period* of solar spots. Whether the spots of the sun affect the heat or climate of different localities on the earth's surface or not, it appears pretty certain that they have a very marked influence on terrestrial magnetism.

M. Hansteen, of Christiana, has lately published a note, in which he shows that two long series of observations, completely independent one of the other, in which the inclination and horizontal intensity of the magnetic needle were noted with different instruments, have given the same periods of maxima and minima at Christiana, at Brussels, at London, and at Paris. The minimum of inclination (or dip) corresponds with the maximum of horizontal intensity, and for both, the period, or the time which elapses between two maxima or two minima is exactly eleven days and one-ninth of a day. *This is the period assigned by M. Wolff to the maxima and minima of the solar spots.* Everything seems to indicate that the minima of solar spots corresponds with a greater intensity in the horizontal activity of the needle and a lesser inclination. The last minimum of solar spots and of the inclination of the needle took place about the middle of the year 1856.

THE ISLE OF WIGHT FROM A PHOTOGRAPHIC POINT OF VIEW.

To the Editor of the "Photographic News."

Sir,—If your correspondent in the Isle of Thanet had visited the Isle of Wight, he would have been aware that there are views in this island which are as much superior to anything that can be seen in the locality with which he seems so much delighted, as they are more numerous. I have been now staying here for some weeks, and can therefore speak with some authority as to the advantages offered by the Isle of Wight to photographers, especially to those whose absence from London, or any other town, can only be for a limited period; and for the benefit of those, and the gratification of the desire which I, in common with many other amateurs, entertain to see myself in print, I beg to send you some account of what I have seen and done.

Before commencing, I may as well mention that I worked only with the dry process (Fothergill's), using sometimes a large plate, 13 by 12, and at other times a small stereoscopic camera, according to circumstances. The results I have obtained by using this process are very satisfactory; so much so, that I have no inclination to try another, not even the much-vaunted collodio-albumen. From the fact of my not having tried the latter process I preclude myself from giving an opinion of their comparative merits, but if the collodio-albumen process could give results equal to those I have obtained by Fothergill's, I think few who tried it would be likely to return to the wet collodion, with all its paraphernalia of tent and so forth.

The very small cost at which the Isle of Wight can be visited makes up to some extent for the high charges of the hotel keepers, who, in consequence of the large influx of visitors within the last few weeks, must have acquired rather an overweening estimate of the value of the accommodation they can give. On the day I arrived at Ryde I was assured that there was not a bed to be had in the whole town, and that only a few nights before strangers had been glad to take up their lodging in bathing machines, and even then a considerable number were wandering about the town all night. To avoid the risk of encountering this hardship in my own particular case I had my luggage placed on a coach going to Sandown, a beautiful place about six miles from Ryde, the road to it being through a most picturesque country, offering every variety of landscape scenery. On one side may be seen gently-rising hills and little valleys covered with waving corn, the purple-flowered clover or dark-green oats, spreading away for miles; while, on the other hand, hundreds of acres of perfectly flat, but by no means unprofitable, grazing land, interspersed with clumps of trees, and thickly dotted with cattle, which the richness of the pasture speedily brings to a condition which renders their continued existence unnecessary. Fortunately, the coach by which I rode belonged to the proprietor of the King's Head Hotel, at Sandown, and I was therefore driven to this house, which otherwise I should not, in all probability, have stayed at, from the fact of its not being very visible from the road, in consequence of its superior situation on the beach itself, which makes it likely to be overlooked by a casual visitor to the place, who is always apt to judge of the quality of an hotel by its outward appearance—a most deceitful criterion, as all experienced travellers know. Well, I was fortunate enough to obtain a room in this hotel which looked out upon one of the most beautiful bays in the kingdom. To the left, about three miles distant, the Culver Cliffs, the highest of which is over 400 feet high, rose from the sea with a boldness which astonishes the weak nerves of the writers of the guide books; while about the same distance to the right the view was terminated by the high hills—so high that I have seen the clouds strike against them and come rolling over their tops—which mark the situation of Shanklin Chine, of which I shall have more to say presently. Standing on the lawn in front of the hotel the eye was able to discern all the hollows of the cliff, and the cottages so snugly sheltered in the nooks, but which excite uncomfortable apprehensions in the minds of strangers as to the possible consequences to the inhabitants in the event of a portion of the cliff above them breaking away. Whenever M. Porro perfects his lens so as to enable me to take a picture of so great an extent at one operation I will return to the island, if it were only to bring away a view of this lovely bay.

The first negative I took after my arrival was one of

Shanklin Chine—the great curiosity of the island. It is simply a cleft in the land, with its widest part towards the sea, and narrowing upwards to the end, where the so-called waterfall trickles over the cliff. This waterfall is a delusion, and those who conceive an image of it in their minds from the picture given of it in those exaggerated publications to which I have already referred, will be disappointed, as the volume of water which falls under ordinary circumstances is about equal to what would fall from the cistern of a shower-bath if seven-tenths of its holes were stopped up. Of course, after a very heavy shower, the volume is increased for a short time, as was the case a few Sundays ago, when, after an exceedingly heavy storm, it rose above the lower rail of the fence which is placed at the head of the Chine to prevent people from tumbling over, and which I imagine to be quite two feet high, so that it became quite a respectable waterfall. While operating in this place I noticed a circumstance which is an additional proof to my mind that the presence of a certain degree of humidity in the atmosphere, combined with heat, renders the action of the chemical rays far more energetic than merely clear, bright sunshine. I exposed a plate at the lower part of the Chine shortly before noon, when the sun's rays must have fallen almost perpendicularly into it. (By the way, though, it is necessary I should first describe the appearance of the Chine, in order that your readers may comprehend better the conditions under which I operated.) The height of the cliff at the point I entered is about one hundred feet, and the width of the opening at the top is, perhaps, fifty feet more, the bottom being very narrow as one penetrates farther in. The sides are covered with underwood and trees, which grow vigorously, their branches meeting at the top so closely that their leaves almost shut out the light. Well, I exposed a plate at the time I stated, and considering the fact that the day was intensely hot, and that the solar rays must have penetrated to almost every part of the Chine, I thought an exposure of ten minutes would be ample—in fact, would rather overdo it; but, to my disappointment, I found that scarcely a trace of an image was visible on developing the plate. The next time I exposed a plate prepared at the same time as the preceding one, and, of course, of precisely identical qualities, but the period at which I exposed it was between three and four o'clock in the afternoon. I suppose it was natural that, having found an exposure of ten minutes at noon-day insufficient, I should prolong the exposure on this occasion; but having once formed an opinion I do not like to change it after a single trial, so I repeated the exposure for the same length of time. On developing I found the picture all but perfect; there was, it is true, a slight want of sharpness in the underwood, but not to an extent which injured the general appearance of the negative. I subsequently took another negative of a portion of the Chine, placing my camera immediately above the waterfall, the hour being the same, the length of exposure being increased one minute, and with an equally satisfactory result. The only explanation I can give of the superior activity of the chemical rays at this hour is, that the temperature of the humid atmosphere of the Chine had been raised by the prolonged action of the solar rays; otherwise, the amount of light present was greater in the first instance than in the subsequent ones. Other and similar causes have almost convinced me that much of the uncertainty which attends photographic operations is, in reality, to be ascribed to the varying conditions of the atmosphere rather than to faults in the collodion or other chemicals employed, as is most commonly done.

Quitting Shanklin Chine, but not before offering a small present to a dignified, not to say sullen, young lady, who acts as Cerberus, I went on to Luccombe Chine, which is about a mile farther on, and, though less imposing than the former place, is still very pretty, and well worthy the trouble of taking a negative. Moreover, there are two or three points on the coast which give very good pictures, very much resembling some of Mr. Gutch's interesting photographs of geological formations. From Luccombe to Black Gang Chine is about seven miles, and along here is what is termed the Undercliff, well known, doubtless, to your readers from engravings, which, however, fail to convey anything like an idea of what it is really like, to those who have never actually seen it. In some parts it is scarcely a quarter of a mile in width, in others it is about a mile, and has been formed by the separation of this portion of the cliff from the mainland. Whether the same process is going on now I cannot say, but similar slips have occurred at recent periods. The greatest slip of the kind I heard of was one which occurred at Niton some years back, when the ground, for a considerable distance, was in motion towards the sea, and, after progressing some distance, fell forward and broke to pieces, when the motion ceased, but the ground was left full of inequalities and large holes, capable, as an old woman told me, who was about fourteen years old when it happened, of swallowing up a hay-rick, if it had come that way. At present, these inequalities are by no means unpleasing to the eye, covered as they are with grass and wild flowers in profusion. From Luccombe, all the way to Black Gang, the photographer feels himself in the position of the girl of the eastern story, who was directed to choose a husband by walking through a corn-field and selecting the ear which pleased her best. He sees so many beautiful views that, conscious of his inability to take them all, he becomes fastidious, and goes on from one to another expecting every minute to see something better, and arrives, eventually, at the end without having taken half the number of negatives he would have liked. The plan I pursued was, to stop a day at one place and a day at another, and make excursions to the places of interest in the neighbourhood, rarely, however, taking more than three plates in one day, which I developed the same night. Perhaps the prettiest place of any along the Undercliff is Bonchurch. The village itself is not very large, though, I believe, it is gradually increasing in size, as, indeed, are most of the towns and villages in the Isle of Wight; but its situation is most delightful. Fine trees, covered with the most luxuriant foliage, abound; and behind it, and rising far above it, is Boniface Down, from which views of great beauty and extent may be obtained. There is one great advantage for the photographer in this island, which is, that the views suited for his purpose are so numerous that the chances of another photographer taking a negative from the same point of view as himself are very small; always excepting show places, such as Shanklin Chine, or certain of the churches, of which I shall speak presently; so that though I have seven negatives of scenes in and about Bonchurch, I am not in the least afraid of anybody else producing a print precisely similar; a most disagreeable circumstance when it occurs, as rendering one or other of the parties liable to be suspected of copying a print belonging to a *confrère*.—Yours obediently, Iota.

Miscellaneous.

"L'Univers" on Photography.—It has not been, perhaps, so much the fashion to depreciate the photographic art in this country as on the Continent. We are, it is true, sometimes told that it is simply a mechanical art, and so forth, but that is not often now, and at present photography has taken her stand among the arts; but in Paris the same ridiculous attacks are persisted in. Thus we read in the *Univers*: "I recently read, and I believe *apropos* of M. Pascal's beautiful work, that, engraving had run its course, and that photography was about to take its place. The *apropos* could not possibly have been more inappropriate. I defy photography ever to produce anything equal to M. Pascal's engraving. Not only will photography never make a portrait, but it will never even copy a tableau or a monument. There is in things a life, they have a physiognomy which the artist alone knows how to seize and express. The artist does not copy; he feels, he interprets, he explains, he makes felt. How can the machine render that which it does not feel? If we cast a glance at the photographs of the monuments of Rome, and there are admirable ones, and afterwards look at engravings of the same monuments by the Piranese, it will be seen that the artist has seized the beautiful and grand verity—the poetic verity, which the machine has failed to catch. Photograph the tableau of Titian which M. Pascal has just engraved, and you will have a heavy exactness, not a resemblance; there will be the same difference between this photograph and the engraving as between the first comer who will read fluently a fable of La Fontaine, and Delsarte who will interpret it. The first comer will mumble a platitude, Delsarte will make you receive the impression of its being an inimitable *chef-d'œuvre*. Both of them, nevertheless, pronounce the same words, and pause at the same stops. It will be the same with photography as with many other fine inventions which were to establish universal equality between man and man; it will not suppress genius, and the genius which it assumes to supplant will relegate it to the rank of utilities." The writer of the preceding is M. Louis Veuillot, the editor, and we believe proprietor, of the *Univers*—a paper which is only known here as having published the most savage and untruthful attacks on England during the time she was engaged in putting down the mutiny in India, and which attacks were from the pen of the same writer, who has now gone out of his way to make an onslaught on photography. The style is peculiarly M. Venillot's; in attacking an art, or an individual, or a nation, he only strives to be bitter, and does not care two straws whether what he says is true or not. His motto is "hors de l'eglise point de salut," that is, of course, outside *his* church, the limits of which are very restricted. Lamartine was not within its walls; therefore, when it was proposed to raise a subscription for that distinguished man, he raised the cry of "Down with Lamartine!" and because England prefers freedom of religious opinion, he chose the moment when she was in trouble to rake up all the lying calumnies against English rule in India which have been printed within the last fifty years, and to exult in the anticipation of her imminent downfall among the nations; and now, because somebody has been rash enough to say that engraving has seen its best days, he comes forward to crush the miserable art which we practise. Of course we feel ourselves overwhelmed and utterly prostrated, now that so great an authority has pronounced photography to be merely a useful thing, and we hardly dare venture to indicate one or two points in his article which appear to us open to objection. He, first of all, defies photography to produce anything equal to M. Pascal's engraving. This engraving, we presume, from what follows, is one of a painting by Titian. Now, we have no hesitation in saying, that if a facsimile of a painting be desired, no engraver in existence could render it with the same fidelity as it could be obtained by means of photography. If the engraver produces a picture superior in an artistic point of view, it is because he has not faithfully followed the original, but has introduced improvements, the fruit of his own imagination and not existing in the original. When the engraver is also the designer, which is seldom the case, it is clear that he is an artist, and stands on the same level as the painter who creates the subject of his pictures; but to maintain that a copy made by hand is superior in truthfulness to a photograph which has been made by the picture itself, is simply absurd. Again, with respect to photographs of monuments, M. Veuillot asserts that they are inferior in appearance to good engravings of them. Granted that this is sometimes the case, yet this is not a proof that the latter are more truthful representations of the object, but the very contrary; for just so much as the hand of the engraver adds to the artistic effect of the engraving, by just so much does he depart from the truth which is accurately given only in the photograph. M. Veuillot asserts that photography is incapable of giving a portrait, but here he errs again. It is quite true that many who have their portraits taken—possibly including M. Veuillot himself—are dissatisfied with them, and very frequently because the likeness is only too faithful; but we admit that as a rule a photograph of an individual does not flatter him—although it not unfrequently does so—yet this is not the fault of the art, but of the sitter. Let the photographer try his utmost, and he rarely succeeds in preventing the sitter from making a face for the occasion. The art is not to blame for this. It cannot render what does not exist. Herein the artist has the advantage; he is not bound to give any particular expression, but simply that under which the sitter appears to most advantage, and this he heightens by a departure from the truth. Yet we have seen a vast number of photographic portraits so beautiful and life-like, that no painting, however elaborate, could equal them; the expression of the countenance rendered in so truthful a manner as to be almost startling. Hence, the want of resemblance which is often *felt* on looking at a photograph, and which the spectator finds it difficult to express in words, arises from the cause we have stated, viz., the fault of the sitter, because the photographer who can in one case produce a perfect portrait, would do so in all cases if it depended on him. That photography has, or ever can, entirely supersede the art of engraving, is out of the question; but that it will do so to a great extent, we have no kind of doubt. Hitherto, the chief attention of photographers has been directed to the improvement of the different processes employed, but improvement in this direction seems apparently to have reached its limits, and their attention in future will be directed more to the improvement of the apparatus. Already there are indications that it may, ere long, be possible to take a picture of a large size directly on a steel or copper-plate, which, by means of Mr. Fox Talbot's process, may be engraved without being touched by the hand.

Photographic Copyright.—The Irish Rolls Court has been again occupied with the copyright question. This second case also concerns the photographers. Messrs. Hamilton and Bewley, it would appear, have been taking copies by the process of photography of several prints published by Mr. E. Gambart, of London, namely, "The Departure, Second Class," "The Return, First Class," "The Schule Scaling," "The Horse Fair in Paris," (Rosa Bonheur,) and "It is I, be not Afraid." Mr. Brewster, Q.C., applied on Tuesday last for an injunction to restrain them. He was proceeding to state the facts of the case, when he was interrupted by Mr. Sullivan, Q.C., who said he did not intend to oppose the motion, as he was satisfied it was one in which an injunction would be granted. The Master of the Rolls said it was only necessary to have heard the notice of motion which Mr. Brewster had read, to feel satisfied that the injunction ought to be granted in this case. The only question which could be disputed by the respondents was this —whether the petitioners were the owners and proprietors of the several copyrights in the pictures stated in the petition. If this fact were so, and it appeared to be conceded by Mr. Sullivan, then it was plain that the respondents had no right to take photographs or other copies of these pictures for the purpose of selling them for their own benefit. Mr. Purcell said it was right on behalf of the respondents, Messrs. Bewley and Evans, to state that they were quite ignorant that these pictures were the property of the petitioner, or that they were acting illegally in taking copies of them. The very moment they became aware of the fact they at once desisted, and expressed their regret for what they had done. The Master of the Rolls said he had lately had occasion to look at the cases and authorities, which he had then before him, and no doubt could be entertained as to the illegality of the act. But the alleged ignorance of the respondents afforded no excuse. They knew they were appropriating for their own benefit the property of their neighbour. It was absurd to say that they thought they were justified in doing so. A man who picked a gentleman's pocket might as well say that he did not know the act was contrary to law, and that he desisted when he became convinced of the fact. No one had a right to appropriate to his own use the property of another, and literary or artistic property was just as valuable as any other species of property, and equally under the protection of the law. —*Athenæum.*

Photographic Notes and Queries.

TRANSFERRING GLASS POSITIVES TO BLACK PAPER.

Sir,—As you were pleased to approve of the transfer I sent you on a former occasion (p. 215), I subjoin the process by which it was effected:—

First, provide some *dark* coloured *glazed* paper of any tint you like; black, purple, or brown will do very well; some clear solution of gutta percha in benzal (about 30 grains to the ounce—in summer it may be a little thicker); some boiling water; cold water; a flat dish, a little larger than the picture to be transferred, and a wooden roller (a common ruler will do) also a little larger than the picture.

Having provided these requisites, cut a square of the paper a trifle (say ¼ of an inch) larger than the glass positive, lay it coloured side upwards on to a piece of glass a trifle larger than itself, but so that one side and end slightly overhangs; hold the corner that is on the glass firmly with the finger and thumb. Pour on as much gutta percha solution as will cover it, assisting it to flow with the tip of your finger (avoiding, if possible, getting the solution under the paper); let it remain on the paper about half a minute, and then pour off the surplus into the bottle again; lift the paper from the glass by the top corner, and hold it before the fire till all signs of spirit disappear from the back, and till the coated side sets smooth and even; a bright fire is best to effect this.

Next, coat the glass positive with the gutta percha solution, as you would coat a plate with collodion; let it rest on the plate an instant, and then pour off and dry at the fire, similar to the paper.

Now pour (through a cloth) as much boiling water into the flat dish as will fill it about ½ an inch deep; gently drop in the glass plate, the *coated side upwards*, and over it float the paper, the *coated side downwards*, and with a brush or pellet of wool wet the back, when it will sink on to the glass; see that it covers the glass, and as soon as you see that the back of the paper is saturated with water, pass the roller over it, beginning at one corner: this must be done evenly to expel all water from between the two coated surfaces. Gently pour off the hot water from the dish, and if there be any appearance of a bubble on the paper, rub it out with your finger; but this will be unnecessary if you have rolled it carefully.

Leaving the plate and paper together in the dish, you must now pour over them a *gentle* stream of cold water till it is thoroughly cold (for a small picture little more than a quart is sufficient); then insert the point of a knife under the glass and lift it altogether from the dish; turn it face upwards, and, holding it by one corner, commence stripping *downwards* at the opposite corner. One of the top corners where the gutta percha is thinnest is the best to begin from. If due care is used it will leave the glass easily, bringing the picture with it embedded in the gutta percha. Gently blot off, and leave it to dry *spontaneously;* the heat of a room (say 70 or 80 degrees), or even warm sunshine will do, *but not the heat of a fire.* When *quite dry* it will probably have rather a mottled appearance, *then* hold it *near* a bright fire, and the picture will become clear almost instantaneously, and the transfer is completed. It must on no account be held to the fire till quite dry, or it will assume a shrivelled appearance.

Tedious as this process may read, it is all accomplished (except the drying) in 5 minutes or even less, and the result is, I think, superior to any transfers I have seen, as the details are so well preserved, the whole so thin and pliable as to be almost equal in that respect to plain paper, and "last though not least," I consider the material used insures the permanency of the picture.

The picture I now send is taken on purple paper, a small portion of which I inclose; the one I sent before was taken on black paper. J. Walter.

MARKINGS IN THE FOTHERGILL PROCESS.

Sir,—In recent numbers of your valuable periodical I have seen some complaints of markings in the Fothergill process by "W. C. J." and "G. M.," &c. I have for some time past practised this process, and have sometimes (I might say many times) been annoyed in the same way. I have tried every plan of getting rid of them, both by making the baths acid, alkaline, or neutral, but to no purpose; neither do I think it is owing to the albumen being applied unevenly, nor to dust, nor to inequalities in draining; but I have found one thing during the course of my practice which I think will prove a complete cure for the markings complained of. No doubt your correspondents have been very particular in getting fresh eggs to prepare the albumen with: this I cannot doubt, as I myself have taken great pains to procure them as fresh as possible. I have shaken them up and left them to settle for twenty-four hours, and then prepared my plates and performed all the other operations in first-rate style, and, on exposing and developing, expected to get first-rate pictures; but, to my disappointment, they have all turned out as above mentioned, and marked in all sorts of shapes and sizes. And now, sir, for what I consider to be the cause of all these markings: I have put this albumen away for a week or more, and then prepared a plate just for experiment, as, during this hot weather, I was afraid that the albumen would have been spoiled. I have, however, found this plate turn out quite well and free from any kind of the markings so complained of. This is what I consider to be the real cause of the marks: the albumen has been used too fresh, as when I have prepared plates as soon as the albumen has settled, I have seldom had plates free from stains; but after having kept the albumen for a week or so, and then prepared plates with it, I have never found any of these markings make their appearance, but have taken some first-rate pictures with them. One in the North.

COLOUR IN PHOTOGRAPHY.

Sir,—As every incident connected with photographic science is of interest to your readers, perhaps the following may be worth inserting. A few days since I purchased a tourist's stereoscopic camera and a dozen of Dr. Norris's plates, and determined to try what success I should have in taking views, having never before touched a camera of any kind. I simply followed the directions accompanying the plates, and the very first I took I discovered, on developing it, to be a counterpart of the scene, as to *colour* as well as definition. The preponderating colour is green (the object being a neighbour's house, surrounded with ornamental shrubs and trees), but the varied hues are very strikingly and accurately transferred. The picture is not a mass of green; the house shows white, and the paths and walls are easily distinguished. Can you tell me how I accomplished this, as I am in the most profound ignorance whether such accidents are common, and what steps I had better take to repeat my former effort with similar success? Edwd. Garrod.

Chronicle Office, Norwich.

[We think our correspondent has mistaken the usual colour of a good negative for an approach to that great desideratum—the fixation of colour. It is a very common circumstance—so common, in fact, as not to excite the wonder which it deserves—for a good negative to show, when viewed as a positive, decided traces of the natural colours of some, if not all, of the various objects which it depicts. The presence of some peculiar kind of organic matter seems to influence this result, and we are sure that if some of that surplus experimentive energy which is now wasted on discovering "New Dry Processes," were to be diverted into this channel, it would be rewarded with very important results.—Ed.]

TRANSPARENT POSITIVES TAKEN DIRECT IN THE CAMERA.

Sir,—Having lately made some attempts at Fothergill's process, I am much surprised to find, on developing my plates, that some of them produce negatives and others *transparent positives.* Can any of your readers solve this problem? I enclose two of the plates—the one marked No. 2 I developed this morning. On the first appearance of the picture, it came out as a negative; but my solution becoming thick, I poured it off and rinsed the plate; on a re-application of the developer, the remaining portion of the picture came out in the way you see—a transparent positive. I have had but little experience in photography, and have scarcely attempted any other process than Fothergill's;

but, as far as my experience has carried me, it seems quite a lottery whether my pictures turn out one or the other—plates prepared at the same time, developed with the same solution, and, sometimes, as in the present instance, the same plate, partaking of both characters. W. H. B.

[The pictures sent by our correspondent are most remarkable, and the phenomenon is one which well deserves careful investigation. Viewed as transparencies, these plates are almost as perfect in their positive effect as some of the most admired French glass stereograms. Their sharpness is surprising: and the intensity of the dark parts and the clearness of the whites show, that if we once knew the causes of this singular reversal of the usual effect of light, we should be placed in possession of a new and valuable branch of our art, and one which would prove of the greatest use in many of the photographic requirements of the present day.—Ed.]

TONING WITH PLATINUM.

Sir,—"Gwenthlian," I think, has used the platinum bath in *too acid* a condition; perhaps the acid was chemically pure instead of being of the ordinary commercial strength. I did not find that much over-printing was necessary. The brown tones which I obtained nearly approached black, but I did not desire to carry the toning farther, as I was well satisfied with the beauty of the brown tones which the proofs acquired. For certain views, such as landscape scenery, I think the rich sepia tones which platinum gives will be found quite unequalled by any shades of *brown* obtained by any other process. I would not recommend the process for obtaining black tones, as the trouble would be too great, and we have so many easier methods of getting black tones. I think your readers will find, if they turn their attention to toning with platinum, that where rich. dark brown tones are desired, they will succeed more readily with platinum than with gold.

Alexander Watt.

PHOTOGRAPHY AND GARDENING.

Sir,—In reply to Mr. F. W. Evans's query in the "News" of the 12th inst., permit me to state that about three months ago I used some water from the developing sink to water a few plants in a room window, and had the mortification to find that next morning they were all shrivelled up and apparently dead, the leaves being all spotted light brown. This, I presume, was caused by the nitric acid in the developer. I at once gave them a copious supply of pure water, which ultimately restored them to health. But for this, I have no doubt they would soon have all been dead.

Excelsior.

PHOTOGRAPHY AND GARDENING.

Sir,—In reply to your correspondent, "F. W. Evans," I can inform him that I have used the washings from the developing sink for watering plants without injuring them in the least.

Success.

ANSWERS TO MINOR QUERIES.

Spontaneous Decomposition of Collodion Negatives.—*York* sends us an account of a curious decomposition which some collodion negatives of his taking have undergone. They were taken in the ordinary way—developed with pyrogallic acid, fixed with hypo.. and then, after well washing, allowed to dry. They were not varnished, but were put away in an ordinary deal plate box. The appearance they now present (after remaining shut up in the box for upwards of a year) is, a loss of intensity in the dark parts of the picture, which have become pale and brown, quite different from that which is sometimes caused from hyposulphite of silver not having been perfectly washed away, and therefore destroying the picture by crystallisation. We think that the cause of destruction in this case must be the decomposition of the pyroxyline. Such an occurrence has been noticed on more than one occasion; and if the pyroxyline had been of an inferior quality, it is not unlikely that it has liberated corrosive oxides of nitrogen, with consequent destruction of the image; the decomposition in this case being similar to that which sometimes takes place in gun cotton which has been kept for some time, sufficient peroxide of nitrogen being sometimes evolved to destroy the paper in which it is kept. Varnishing the negatives appears likely to protect them—at least, we have never heard of a negative fading which had been varnished with good spirit varnish.

Substitute for Ground Glass.—*J. C. Gray.* A good substitute for the ground glass in the camera can be made in a few minutes by rolling a piece of glazier's putty over a clean piece of plate glass. A few trials will show the degree of stiffness the putty should be of, in order to produce the finest effect.

TO CORRESPONDENTS.

H. S. T.—We will think over the suggestion of the lists; it seems a very excellent one, but, to be of use, it should include all the processes. In answer to your queries—1. We cannot understand how it was that a mixture of alcohol and ether failed to remove the crust from an old collodion bottle. Perhaps there was too much alcohol, or the bottle might have been wet. Try some mechanical method of removing it, such as shaking up sand and water in it, or scraping the crust off with a stick, and afterwards soak in strong solution of soda. A toning bath bottle may be cleaned by pouring into it a little strong nitric acid. 2. An albumen bottle is best cleaned by means of cyanide of potassium solution, allowed to soak in for some time. A varnish bottle will offer more difficulty; different solvents should be tried one after the other, such as alcohol, benzol, old waste collodion, &c., and when the varnish is softened, rinse out with abundance of water, and allow a warm, strong, solution of soda to stay in it for some time. Most probably the list will appear in our next.

J. S. O.—We cannot, of course, answer for the genuineness of all the "thirteen postage stamp" secrets which are being daily advertised, and if a person makes up his mind to answer one, he must consider it in the light of a lottery, he *may* get something useful: but, on the other hand, there is a great chance of his losing his money altogether. Your name shall remain as hitherto.

J. W. P.—We think the solar camera likely to be of great use in printing large positives from small negatives, provided the demand is sufficient to render it worth while to go to the expense of an instrument. As to the validity of the patent, we cannot give an opinion. We cannot see what there is in it to patent, as the construction has been described and carried out frequently in this country.

J. G. Johnstone.—1. You will find many useful articles on the subject of your queries in numbers previous to No. 36. The circular stains you mention are incipient blisters, and can only be avoided by taking the precautions customary in such cases. 2. Common water may be used for the bulk of the washing, provided distilled water is employed for the last rinsing or two.

Calos.—1. Do *not* add alum to the fixing solution for positive prints, unless you wish to spoil it. 2. No, undoubtedly. 3. Whenever the information given in these notices is of general interest, we give it in such a manner that both question and answer may be known to the general reader. In other cases it would only be a waste of space to give the query as well as answer.

Devon.—The complete portrait combination should be used for the lenses in your magic lantern, and the picture to be magnified should occupy exactly the same position, with respect to the lenses, as it did whilst it was being taken in the camera. The condenser should be between the lamp and the picture, *not* between the picture and lens.

A Novice.—We cannot possibly account for the extraordinary occurrence mentioned by our correspondent from the mere statement of the fact. Such a thing is quite opposed to all our experience, and we should, therefore, require a full account of the preparation of the materials, and mode of manipulation, before we could venture a guess.

F. C. L.—Many methods have been given in recent numbers of the "Photographic News." We cannot refer you to better processes than will be there found.

J. Belnos.—Received. We see no reason why the Aberdeen Society should object to receive the case of specimens as you describe, but if you have any doubts you should write to the secretary.

N.—We have found a coating of soft solder applied over the lead of use in arresting or preventing the corrosion of the surface. We will consider the query about gutta percha and reply in a subsequent number.

J. W B.—Either blue glass, of the colour inclosed, or colourless glass with muslin curtains, sufficiently high to prevent passers-by looking in. Clear colourless glass for the roof in either case.

J. C. S.—Increase the strength of your silver bath, as it is likely that it has become weakened by use. If this does not remedy the spots, use "O's" toning process given at the commencement of our second volume.

J. O. P.—We cannot undertake to do chemical analyses for every correspondent who forwards substances to us with the request that we will tell him what it is.

M. D.—The sample of waxed paper is unfit for use. From its granular appearance we should be inclined to say that the iron with which it was ironed had been far too hot.

S. B. C.—See answer to J. W. P. The enlarged positives are well adapted for colouring afterwards.

Focus.—Place the diaphragm immediately in front of the anterior combination.

A Young Photographer.—Send a stamped and addressed envelope and we will reply.

E. G. W—We will obtain the desired information and insert it in the "News."

W. Woodward.—In an early number.

Communications declined with thanks.—P. O. S. T.—A Young Photo.—Alloy.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—Sir O. P.—Theophilus.—St. El.—M. A. R.

In Type.—H. M.—X. X.—An Amateur.—G. R. G.—J. B. Hockin.—B. M. Brackenridge.—M. A. Root.—J. S. Overton.—G. R.—Knostian.—W. L.—G H. W.—I. W. W.—F. Debenham.—R. J. Fowler.—Success.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

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OBSERVATIONS ON M. NIEPCE'S NEW ACTION OF LIGHT.

BY M. L'ABBE LABORDE.

In repeating the experiment made by M. Nièpce on the persistent activity of light, I remarked, at the very commencement, a characteristic difference between the effect produced by the insolated paper, and that which results from the direct action of the light. When a sensitised paper is exposed, for a few instants only, to the direct action of light, the tint it acquires is only superficial, and may be removed by scraping it lightly with a penknife; but if this paper has undergone a sufficiently prolonged action of the insolated paper, this tint is not merely on the surface, but penetrates through the whole substance of the paper.

In each of my experiments, I used a tinned iron canister, 18 centimetres in height and 8 in diameter, which I lined with a thin piece of cardboard impregnated with tartaric acid, and which had been exposed to the sun for about four hours.

The sensitised paper, prepared as for ordinary positives, was applied on a glass disk fixed on the lower part of the cork which closed the bottle. The action of the insolated paper was prolonged for from twelve to fifteen hours. A glass plate, notwithstanding its transparence, protected the sensitised paper perfectly, provided it had been carefully cleaned, otherwise the paper blackened as much, or even more, than if the glass had not been present.

First Experiment.—The sensitive paper was partly covered with a thin bit of glass, and across this a second piece was placed, which was intended to prevent any action from *radiation*, but not from circulation. When I opened the box, the sensitised paper was blackened everywhere, except immediately under the glass in contact with it. Still, if this glass be exceedingly thin, so that the cross piece is brought very close to the paper without being actually in contact with it, it preserves the subjacent paper from much of the action of the *circulation*. I substituted a piece of ivory for this second piece, with a like result. My motive for doing this was, because people might have said that the insolated paper was capable of acting through transparent substances, provided it was aided by air frequently renewed: since certain impressionable substances—as bitumen of Judea, for example—are insensible to the action of light when excluded from contact with the air.

Second Experiment.—The box containing the insolated cardboard was left for four hours in a hot place; I then opened it carefully, with the mouth downwards, and drew out the cardboard very gently; I quickly placed a piece of sensitised paper on the bottom of the cork, and laid a strip of glass across it, and then fitted it into the box; I then put it in a cool place, and when I opened it, after the lapse of twelve hours, I found the uncovered portion of the sensitive paper blackened, notwithstanding the absence of the insolated cardboard.

It is quite unnecessary to discuss these two experiments to demonstrate what is so very evident, that we have to do with an emanation, and not a radiation.

What is the nature of this substance which escapes from the insolated cardboard, and acts on the sensitised paper? The following facts prove that it is a volatile acid—very probably formic acid:—

a. Blue litmus paper, partly covered by a strip of glass, and exposed to the action of the insolated cardboard, always reddens on its uncovered surface. This experiment I repeated many times.

b. In order to prove that this volatile acid was really the active substance, I enveloped a large glass tube in blotting paper, moistened with a solution of potash; I fixed it to the bottom of the box on the inside, so that it rose to a level with the opening; I then introduced the insolated cardboard, and placed on the bottom of the cork a piece of sensitive paper and a piece of blue litmus paper, and across that a strip of glass, and then closed the box. At the end of twelve hours, neither the blue litmus paper nor the sensitive paper had changed their colour; in the absence of the volatile acid, which had been neutralised by the potash, no action was manifested.

To determine positively the nature of this acid, it would be necessary to collect a ponderable quantity. I had recourse to other means, the *ensemble* of which renders the existence of formic acid very probable.

1. I put a little distilled water in a very clean porcelain capsule, and exposed it for twelve hours to the action of the insolated paper. A few drops of nitrate of silver were then added to it, and it was heated to ebullition; the liquid speedily became darkened, as happens when the same experiment is made with the most minute quantity of formic acid added.

2. I replaced the distilled water by a solution of acetate of lead, and after leaving it to the action of the insolated cardboard for two days, I found the surface covered with a lot of little white points, which I was able to take up with paper; I boiled these particles in a weak solution of nitrate of silver, which it reduced to a metallic state, as would have happened if formiate of lead had been employed directly. It may be urged that minute quantities of tartaric acid had fallen from the cardboard into the liquid, and so formed tartrate of lead; but tartrate of lead does not reduce salts of silver, as formiate does.

3. By smelling the interior of the box at the moment when it was opened, a mingled odour of burnt sugar and formic acid could be detected. The presence of formic acid is likewise very naturally explained, when we consider the influences to which the paper impregnated with tartaric acid is submitted.

In fact, the action of light may manifest itself by two entirely contrary effects—reduction or oxidation. The direct effect is always a reduction; it manifests itself thus on the salts of silver, gold, &c., and to this must be added that which exceeds all others in its energy and its consequences—the reduction of carbonic acid in the leaves of plants. But reduction supposes the separation of the oxygen, or any other electro-negative element—a separation which brings it to the nascent condition, and renders it eminently apt to unite itself with substances with which it is in contact. If the oxidised body, by its nature and properties, becomes more apparent and palpable in some sort than the reduced body, the oxidation appears then to be the sole effect of the light; but it is a secondary effect, such as is observed in the case of bitumen of Judea, essence of turpentine, linseed oil, &c.; I would add, and on tartaric acid, if it be admitted that, under the influence of light, oxygen tends to separate itself from the organic matter impregnated with tartaric acid; for this oxygen in the nascent state would unite itself with the tartaric acid and produce formic acid. The affinity of oxygen for tartaric acid likewise assists in this transformation; it suffices, in fact, to add peroxide of lead to a strong solution of tartaric acid to obtain immediately an emanation of formic acid. I availed myself of this property, which tartaric acid possesses, of oxidising itself easily, to check the preceding effects in the following manner: I put a concentrated solution of tartaric acid and peroxide of lead into a test tube; on the mouth of this tube, and, consequently, above the liquid, I fastened a large cork, having on its under side a piece of sensitive paper, and a piece of blue litmus paper, crossed by a strip of glass, and put it in a dark place, and, after a short time, I found that the sensitive paper had darkened, and the blue litmus paper reddened, precisely as if they had been exposed for twelve or fifteen hours to the action of the insolated cardboard. I will add, as a further point of resemblance, that in both cases the reddened litmus paper, on being left to the action of the atmosphere, re-assumed its original blue tint.

The facts I have stated will no longer permit the admission of a persistent activity of light, and still less of a stored-up light; but if the experiment of M. Nièpce, thus explained, loses its strangeness, it does not the less preserve the seal of originality which characterises all the researches of its author.

MM. Bouillon and Sauvage had already concluded from their researches that the reduction of a sensitive paper was neither due to the action of heat nor stored-up light. The only experiment which they cited to prove that this reduction was not due to stored-up light might leave some doubts in the mind, since M. Nièpce had himself made it, and refuted the conclusions that might be drawn from it, by stating that the luminous radiations emitted by phosphorus burning slowly in the air did not act through glass.

MM. Bouillon and Sauvage attribute the reduction of the sensitive paper to a peculiar volatile body, and suspect ozone; but ozone, far from being a reducing agent, is an eminently oxidising body. We might assign it another *rôle*, indirect but decisive, entirely similar to that I have attributed to oxygen, which light may separate in a nascent statement from organic matter; for ozone is nothing else than oxygen restored to, or preserved in, a nascent state, susceptible from that very circumstance of oxidising most bodies; and as almost all organic substances—gum, sugar, lignine, tartaric acid, &c.—produce formic acid with a mixture capable of oxidising them, it will be seen what *rôle* ozone, or oxygen in a nascent state, may perform, not only in this first experiment of M. Nièpce, but likewise whenever organic matters are exposed to the action of light.

[Our own experiments, as well as those subsequent conducted by M. Nièpce, prove that MM. Bouillon and Sauvage are in error in asserting that heat does not reduce the silver in prepared paper.—Ed.]

FIXING PHOTOGRAPHIC PRINTS.

BY MR. SNELLING.

The various theories on this subject advanced by numerous writers on, and practisers in, photography, do not seem much to have helped the matter. The principles laid down are generally sound; but photographers are sometimes misled by those who delve more into theory than practice. We all know that, in order to fix a proof, it must be submitted to a chemical solution, which shall have the power to deprive the paper of every particle of silver that remains unchanged after its submission to light under the negative; and also that it is equally necessary to remove afterwards every trace of the chemical agent employed in the solution of this unchanged silver from the picture.

For this removal of the unchanged silver, various methods have been adopted; but it is now conceded by all photographers, that hyposulphite of soda is the best and safest solvent. The length of time to which the print should be submitted to the bath of hyposulphite, is also a mooted point. Many photographers advise, that the print be submitted to one or more baths of pure water before putting it into the fixing bath; others place it first into a fixing bath and afterwards into the toning bath, and lastly into plain water. I think a simpler way better.

First soaking in pure water, it is said, gives the print a clearer and more brilliant effect. This I doubt. The washing out of the unchanged silver in plain water is not sufficiently expeditious to prevent a slight darkening in the lights, even in a dark room—the water itself, in my opinion, derived from long practice, inducing a change in this respect.

Submitting the proof first to a hypo. and then to a toning bath is also objectionable, particularly when it is desired to produce fine blacks. By this method the print imbibes an excess of hyposulphite of soda, that no amount of subsequent washing will eradicate, without destroying also its delicacy and strength of colour. Mr. Evrard says in his Treatise on Photography, that "water has no action on the salt of silver which the light has reduced," &c. To a certain extent this is correct, *i.e.*, so far as the salt itself is concerned; but long soaking in water—sufficiently long to deprive the paper of all the hypo. imbibed by this process—loosens the texture of the paper to such a degree, that portions of the changed silver are detached and washed away, leaving the proof exceedingly weak. In following this method, it is usual to leave the print in the hypo. solution until it becomes of a reddish-brown colour; it is then submitted to the toning bath until the desired colour is obtained. Such pictures, so treated, will most assuredly fade. In fact, the destructive principle commences in the toning bath, and no amount of washing will prevent its progress towards the entire obliteration of the picture. Both baths also soon become acid from hypo-sulphurous acid—a most powerfully destructive agent. This is hastened in hot weather, and but a few seconds' immersion will so effectually impregnate the print with this acid, that nothing can save it. I am speaking now of the use of two baths: the first a fixing bath of hypo. only; the second, a toning bath composed of hyposulphite of soda, chloride of silver, and chloride of gold. The first bath is useless. When the second only is used, it should be of a strength sufficient to produce the deepest purple tint—in from ten to twenty minutes—not more than twenty. To assure permanence by this bath, the deep purple tint should never be passed. To stop a little short of this would be more advisable. Sulphuration commences the moment the picture passes to the bath. Allow the picture to remain a minute longer in the bath, after it has passed the purple, and a slight fringe of yellow will circle its edges; take it out, wash it twenty-four hours in running water, and submit it to the light under any circumstances you please, it will fade in a short time.

In toning, there are no general rules that will apply to any one bath. The same bath will work differently on different days, and frequently at different hours of the same day. I have found that my baths very frequently give beautiful, clear blacks in the morning, when in the afternoon no amount of toning would produce the same effect. Every attempt to change its operations only made bad matters worse. I therefore came to the conclusion to let them alone, and be guided entirely by the brilliancy or dullness of the print during its immersion: so long as they were clear and brilliant both in lights and shades I made no alterations. When dullness, or a veil appeared in the whites, I added hypo. in small quantities until the defect was corrected. If the shadows presented the same appearance, I gradually added chloride of gold, which often proved effectual; and when both lights and shades were dull or clouded, both hypo. and chloride were added; but when these were not effectual, I found the bath to be too acid, and neutralised it with carbonate of soda.

The amount of gold or silver taken up by each print cannot be safely calculated for universal practice, as no two samples of paper will work alike in this respect; as a rule, therefore, add more silver than gold when the picture appears weak or thin, after obtaining the desired colour in the proper time—which should be in not more than twenty minutes. Of course it is necessary that the print should be brought up to the proper strength in the pressure-frame; which strength can only be ascertained by due reference to the capabilities of the negative, some requiring more intensity of colouring in the positive than others, to produce a given result. Much of the brilliancy of a print depends upon the quality of the paper. A porous—badly-sized—coarse-grained paper will be deficient in this respect; and it is the fineness of grain, more than any other quality in the albumenised paper, that renders the prints made on it so charming to the artistic eye. It is, also, only on albumenised paper that a permanent sepia tint—so much admired by artists—can be obtained. In order to obtain this much-desired colour with a surety of permanence, we must employ a salt that will give it within the period of time necessary to fix a print. Two drops of chloro-chromic acid in the ordinary gold bath of half a gallon, will produce a very fine warm sepia, or brown colour; but there is some fear of its eventually destroying the picture.

The use of warm water in fixing I consider decidedly injurious. The only good quality it possesses, is the speedy removal of the hypo. Its objections are, weakening of the print, destruction of the sizing, and consequent loosening of the fibre; and imparting greater tendency to the sulphurisation. Cold water is decidedly preferable, as it obviates all these difficulties without creating new ones, besides giving greater brilliancy. Prints treated in every way alike, except in the temperature of the washing bath, produced the differences above stated; and when exposed to the atmosphere, those submitted to the warm solution faded in a few days, while the others have remained unchanged. Where running water can be procured, no other should be used for the final washing.

It will be observed that prints, when immersed in the toning bath, pass through several tints of colour—no matter what the composition of the solution may be. First we have a light yellow ochre, passing through several shades to a deep brown, from which it changes to purple, which may be deepened to an intense black, if the printing and toning solution are sufficiently strong. If the print is continued in the solution after it has attained the black, the process of change in colour is reversed, and it again goes through the same series of colours, from black to yellow, and it may be suffered to remain until not a trace of the picture is left.

Now this fully proves that there is a certain point to be attained in the toning of a print where perfect fixation is obtained; to go beyond, or fall short of this point, entails destruction of the picture. This point is a delicate one in most instances, and it requires a good perception of colour in the manipulator to decide upon it in all cases. This point is the purple stage. Some solutions work up to this stage very slowly and give it with great intensity, while others give it quickly, and of various tints and strengths. Occasionally it is perceptible for a very brief period, in which case it is necessary to be expeditious in removing the prints from the bath, or they will enter the destructive stage before their removal can be accomplished. This purple stage is even perceptible in pictures toned to the brown (or umber) colour, seeming simply to cover the surface of the print as a perfectly transparent film. It remains but an instant, the print quickly passing to a decided brown, and from that to the lighter shades as before described. In fact, the change is so rapid in some new baths, that it is dangerous to take the eye off the print in its passage from the first brown to the purple tint.

As I before remarked, the rapidity or slowness of toning depends greatly upon the temperature, being accelerated by heat and retarded by cold, and it should be the object of the photographer to keep the solution at as even a temperature—say 60°—as possible.

The theory that the strength of the salting solution should be in proportion to that of the nitrate of silver, is not always correct. Were it possible always to obtain paper perfectly uniform in weight, texture and size, it might hold good; but as this cannot be, the best rule is, that the strength of the salting should be in proportion to the thickness and closeness of the paper.

From this it follows that the manipulator must be constantly on the alert to modify his printing formulas to suit the *nature of the paper* to be worked. The sizing of the paper also modifies the colour of the print.

Another point to be observed in order to obtain certain results, is that the colour and tone of the positive is in a measure dependent upon the negative. This may seem strange to some, but it is nevertheless true. It is not possible to obtain black prints from some negatives, while others admit of any colour or shade of colour.

From what I have said on this subject I arrive at these facts, to establish the certainty of permanence in photographic positive proofs:—

Weak baths will not produce strong colours without endangering the print.

The quicker the print can be toned to the required tint and the unchanged silver washed out, the more certain the fixation; and, therefore, a bath sufficiently strong to do this in from five to twenty minutes (the latter being the utmost extent) should be used.

The point of certainty for the complete fixation of the print is the purple stage, therefore prints should not be permitted to pass or fall short of it.

Warm solutions should never be used, owing to the rapidity with which they dissolve out the sizing and weaken the picture. They also destroy its brilliancy.

ON OBTAINING DIRECT POSITIVES ON GLASS.

BY M. LE GRICE.

It very frequently happens, that, in taking photographs upon collodion, pictures are obtained which, when examined by reflected light, are very visible, and more or less beautiful. These photographs are known to all, under the name of direct positives on glass. They are sometimes of a deep yellow colour, and sometimes exhibit much analogy with a daguerreotype proof, without, however, possessing its delicacy. These pictures are very much admired by beginners in the art of photography, but are very little esteemed by artists, because their execution in general leaves much to be desired. I have for several years busied myself with this process, and after many experiments, have succeeded in producing these positives with certainty and ease; and the proofs which I have sent you offer, in my opinion, certain advantages—as, for instance, the greatest lights are well marked, without, however, presenting a metallic and lustrous surface. Some modelling may be seen on the pure whites, and there is still a marked contrast between the lights and shadows. The different muscles of the face are well defined—an advantage but rarely found in portraits upon paper, which generally are indebted for their beauty and finish to the skilful hand of a painter. All collodions, if simply iodised, as by iodide of potassium, of ammonium, of cadmum, calcium, &c., without the addition of other salts, as the bromides and fluorides, &c., and the silver bath not being impregnated by iodide of silver, yield, as is generally known, a black and white picture without half tints, and without any modelling; so that one is always obliged to have recourse to these latter substances in order to obtain a perfect impression. The combination that I use, and which has been used with great success in Germany, where it was published some time since, is the following:—A mixture is made in a bottle, with the necessary precautions, of five grammes of bromine in thirty-five grammes of absolute alcohol. This mixture is poured into another bottle containing five grammes of hydrate of lime; this is shaken, and to it is added from twenty to twenty-five drops of hydrochloric acid. In a few days, the liquid which covers the lime entirely loses its colour, and becomes as limpid as water. Ten, fifteen, or twenty drops of this mixture, added to 100 grammes of a collodion iodised with iodide of zinc, produce the collodion which I use, and which I have found the most sensitive of any tried by me, for the red and yellow rays. The picture is developed by means of a solution of sulphate of iron, with the addition of boracic or acetic acid, with from two to three per cent. of alcohol, and is fixed with hyposulphite of soda or the cyanide of potassium. In order to obtain negatives, the exposure must be longer; and after the picture is fixed and washed, it is moistened with a weak aqueous solution of nitrate of silver, containing only the slightest quantity of iodide of silver in solution. The moistened plate is exposed for a very short time to a faint diffused light; and, without washing, it is plunged into a bath of solution of sulphate of iron, and then washed, &c. By this process negatives are obtained, in which the half-tints are better than in those obtained with a negative collodion, and developed by pyrogallic acid. Too long an exposure to the diffused light is sometimes the cause of the picture being converted into a positive, as seen by transparency. This is also the case when the solution of nitrate of silver with which the glass is moistened, contains too much iodide of silver.

THE ROCK-TABLETS OF MOUNT SINAI.

We believe it was the elder Niebuhr, who, in his travels in Arabia, first mentioned those huge rock-inscriptions of Sinai, which seem to extend to the length of several miles. Johannes von Müller alludes to them most pointedly, and recommends them to the attention of travellers and archæologists. We are not aware whether Sir G. Wilkinson ever mentioned them in his works, being subjects of an *ambiguous* bearing. However, nothing satisfactory could have been made of them until now, when albumenised plates, 36 inches long, can bring them down to the meanest understanding, as the phrase goes. It was, of course, quite impossible to erect any scaffolding on the flanks of Mount Sinai, and to copy those rock-tablets, at any rate incompletely and unsatisfactorily. But now the remedy is easy. At whatever height those inscriptions may exist, and whatever extent they may embrace, they will and must descend, *in propria personâ*, as it were, and reappear on the sheets of the camera with all their characteristics. In such cases lies the triumphs of photography, to render services to science and art which, hitherto, no amount of labour, or the most wasteful expense, could have achieved. We trust the time will not be distant, when some of our enthusiastic travelling photographers will spend their vacations in copying those rock-tablets of the Sinai of Moses. Judging from the inscriptions of Nineveh, they may illustrate the historical part of our sacred books.

Dictionary of Photography.

Fluorine.—An elementary body unknown in the uncombined state. It is analogous to chlorine, bromine, and iodine, and, like these bodies, forms compounds with the metals which are similar to the chlorides, bromides, and iodides. These are called fluorides; and as they are of some value in photography, we will give a description of some of the most important of these salts:—

Fluoride of Ammonium.—This salt is obtained by saturating hydrofluoric acid with ammonia; or, by heating a mixture of sal-ammoniac and fluoride of sodium in a platinum vessel, the lid of which is kept cool by dropping water on it; the fluoride of ammonium, in this case, sublimes on the under surface in small prisms. The salt is permanent in the air, has a pungent, saline taste, and slightly etches glass, both in the solid form or in solution. It dissolves readily in water, and is sometimes used in photography, as are also the other fluorides, to obtain increased rapidity.

Fluoride of Calcium, or fluor spar, is a very beautiful mineral, occurring in large cubical crystals of a rich blue or green translucent appearance. It is the principal source of the compounds of fluorine in commerce, and is largely used in the preparation of hydrofluoric acid.

Fluoride of Potassium is a white, soluble salt, which may be prepared by adding hydrofluoric acid to carbonate of potassa, and evaporating the solution to crystallisation in a lead capsule. It is used for similar purposes to the corresponding ammonium salt.

Fluoride of Silver.—A compound of equal equivalents of the elements fluorine and silver. This salt differs from the other compounds of silver with elements of the chlorine group, inasmuch as it is very *soluble in water*. For this reason it will be seen, that formulæ in which fluoride of potassium or ammonium are introduced, in conjunction with an iodide or chloride, are based upon an ignorance of the properties of this salt; as, in the sensitising process, the fluoride of silver would dissolve out, and remain in the silver solution. If it be desired to introduce fluoride of silver in the sensitive film, it will be advisable not to introduce it along with the iodising compound, but to mix it with the *last* bath in which the film is introduced before exposure. Thus, in the collodion process, fluoride of silver should be introduced into the nitrate bath if experiments are to be made upon this body; in the wax paper process a little fluoride of silver should be dissolved in one of the washing waters; and in the talbotype process, in the exciting silver solution.

Focimeter.—An instrument invented by M. Claudet for measuring the difference between the usual and optical foci of lenses. It consists of eight segments of a circle mounted upon a central axis and arranged about two inches apart, in such a manner that, to a person situated in a line with the axis, the whole should appear to form one disc; each segment being numbered, and having besides several devices and fine lines drawn in different parts for the better distinguishing of the focus. Upon focusing Nos. 4 or 5 accurately upon the ground glass, it may be seen, upon taking a photograph of the arrangement, which numbered segment is in true photographic focus, and then, by simple measurement between the foci of the *optically* sharp and the *chemically* sharp segments, the degree of adjustment for the lens at the given distance may be obtained.

Focus.—The point at which any number of rays meet after being reflected or refracted. This point depends upon the form of the lens, the refracting power of the substance of which it is composed, and the distance of the source of light from the lens. The less convex the lens is the more distant is the focus. The higher, also, the refracting power of the substance of which the lens is formed, the shorter will be the focus. The length of focus also varies with the distance at which the luminous body is situated whose image is formed at the focus: thus, a near object will give a focal image farther off than a more distant object. In speaking of the focal length of a lens, this fact should be remembered, and the focus obtained by forming an image of a body at a great distance off—as the sun, for instance—and then carefully measuring the distance between its image and the lens.

(*To be continued.*)

The Amateur Mechanic.

GUTTA PERCHA—*(continued)*.

Numerous questions have reached us at various times, as to the best lining for sinks, large wooden washing trays, &c. For any of these purposes, gutta percha in various forms possesses many advantages. For large washing trays of wood, varnishing with gutta percha solution will be frequently found sufficient. Mr. Woodward, the patentee of the solar camera for the production of life-size portraits, uses for toning, fixing, and washing these large prints, trays made of wood lined with paper, and then varnished with a solution of gutta percha in chloroform. Such trays, being water-tight, are found to answer the purpose perfectly well. There are two or three preparations of cloth, canvas, and muslin rendered quite waterproof by a solution of gutta percha, which might be applied to similar purposes. Perhaps the most useful article for such linings is the gutta percha paper, which is prepared, we believe, with an especial view to use on damp walls prior to the application of the usual ornamental papers. It consists of two sheets of paper, between which is rolled, whilst hot, a thin sheet of gutta percha. The three thicknesses thus joined are not stouter than ordinary cartridge paper, and may be applied easily as lining to trays, &c., by the aid of gutta percha solution.

For the lining of sinks, however, which will necessarily be liable to occasional rough usage in the rinsing of plates, &c., the sheet gutta percha itself will often be found preferable. For this purpose, the Gutta Percha Company recommend sheets of not less than 5-32nds of an inch thick. In many cases, we apprehend that would be thicker than necessary; about 3-32nds of an inch, perhaps, being a desirable thickness. As the article is generally sold by weight, it may, perhaps, be of interest to mention the relation of size to weight in sheet for this purpose. A square yard of sheet 1-32nd part of an inch thick, weighs 1¼lbs.; a square yard, 1-16th thick, just about double that weight, and so on in proportion.

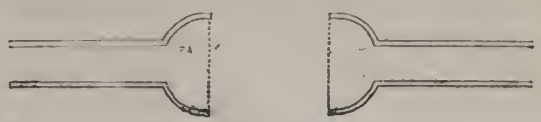
In order to line a sink properly, proceed as follows: cut the pieces the exact size each for its place, sides, ends, and bottom. Fit each to its place, and secure them temporarily with wooden battens placed across. Then take a strip of gutta percha of the same thickness, or a little thicker, and about two inches broad; place it in hot water until it is sufficiently plastic, then dry it carefully, and slightly wipe with a piece of cloth moistened in benzol, so as to secure a perfectly clean surface. With a warm iron now pass gently over each joint of the sheet to soften them, and immediately press the softened strip on to the joint, carefully pressing it close and flat throughout. A secure, neat waterproof joint will be thus effected. It is scarcely necessary here to observe, that where the waste solutions are preserved and the silver recovered, the use of sinks lined with gutta percha presents the greatest facilities for such recovery.

To join gutta percha tubing to such sinks, a circular hole of the same diameter as the tubing should be made. The end of the tubing to be joined should then be placed in boiling water for a few minutes, when it will expand and assume a bell-like form. The unsoftened end of the tubing should then be put through the hole, just leaving the bell-like expansion projecting above the orifice, the sheet immediately around which should then be heated with a piece of hot iron. The softened end of the tubing should then be pressed outward into a flange and brought into contact with the heated surface of the sheet immediately around it, and pressed close and firm. The perfect uniting of the two softened surfaces will be more certainly secured if both are slightly moistened with benzol to ensure the absence of dirt or grease immediately before bringing them into contact.

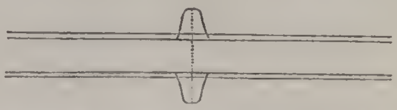
Gutta percha tubing for communication with a sink will frequently require joining to some metal pipe attached to a cistern. The best mode of effecting this is as follows: soften the end of the gutta percha tubing in hot water and then wipe off the moisture, after which slightly warm the metal pipe. The expansion of the tubing will allow the end of the metal pipe to be inserted; the gutta percha tubing must now be kept gently and constantly pressed with the palm of the hand until it is quite cold, when it will be found to form a perfect joint. No bandage or wrapping will be required if these instructions are properly carried out, as the contraction of the gutta percha on cooling gives a firm bite or grasp on the metal pipe.

If the tubing be exposed to the atmosphere, it is desirable to paint it white, which reflecting instead of absorbing the rays of the sun, will prevent the injurious action of the heat on gutta percha.

Where it is necessary to join together two pieces of gutta percha tubing, to gain additional length, it may be done as follows: place in hot water the two ends to be joined until they expand, taking care to prevent the tube from contracting and closing at the point immediately adjoining the expansion. The two pieces of tubing will present somewhat the following form:—



Wipe away all moisture, and rub with a little benzol the surfaces to be joined; then bring together and press firmly the two bell-like ends, which will flatten. The flattened ends must be pressed firmly together with the finger and thumb until cool. They will form a joint something like the following:



The projecting flanges may be neatly pared down, not too closely, however, or it may weaken the joint.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 20th August, 1859.

A new work on photography has just made its appearance in Paris, with the title "Manuel Théorique et Pratique de Photographie sur Collodion et sur Albumine," by M. E. Robiquet. If I were to mention this little book as a practical manual for beginners, I should feel inclined to speak well of it; but if I am to speak of it as a treatise on theoretical and practical photography, I should feel bound to condemn it severely. M. Robiquet has condensed into a small volume of about 300 pages a number of processes, which he has employed himself for some years past, on albumen and collodion. He avows in his preface that he has had no intention of writing a complete treatise, and that his book is chiefly intended for beginners. Perhaps the best I can say of it is, that the work is illustrated; the figures are inserted in the text, and facilitate considerably the comprehension of all the different operations.

M. Robiquet has divided his work into three parts: the first includes all the manipulations for the production of positive and negative proofs, and details on the choice of an instrument. Nothing appears more simple than the choice of a good instrument; nothing is, however, more troublesome. M. Robiquet insists very properly upon the refractive powers of the objective. "If the substance of which the lens is composed is too heavy (as in glass, in which oxides of lead or baryta have been combined), the refractive power is considerable, and these lens must have curves of long radii; the photogenic action that takes place through them is slow, but the images formed are very clear. If, on the contrary, the substance of the glass is very light (as in glass with lime, or oxide of zinc, &c.), the refractive powers are weaker, and that the optical focus shall not be too long, the lens must have curves with short radii, which often occasion aberration of sphericity. In the latter case the images are formed very near to the objective, are strongly illuminated, and are rapidly produced, but they are far less neat than those which are obtained with heavier glass."

M. Robiquet displays his ignorance when he asserts that there exist no mathematical formula for the curves of photographic lens; he regrets that "in this circumstance science is less advanced than industry"(!). The author, before making such a formal and absurd declaration, should have consulted the admirable papers that M. Porro has written upon the subject, and inserted in the *Bulletin de la Société Française*, about a year or so ago.

Again, I cannot forbear condemning a work in which an historical sketch of photography is given, from the earliest times down to the present day, and in which the name of Thomas Archer is completely forgotten!

The second part of the book is entirely devoted to the chemical products employed in photography. This is good, and ably written. Almost the whole of the third division is devoted to the theory of binocular vision, occupying no less than 70 pages, of which three-fourths are copied from a memoir of M. Giraud Teulon. It is, perhaps, the best part of the book, though M. l'Abbé Moigne thinks that the explanations of these phenomena are more clearly given in his edition of Dr. Brewer's "Key of Science."

In conclusion, I repeat, M. Robiquet's work may prove very useful to persons who have no idea of photography, and would give them the means of commencing operations at once. In this respect it may be recommended; but, as a scientific and impartial work on photography, it does not merit two words of praise.

In the *Annali di Chimica*, of Milan, I find a note on two methods of preserving protosulphate of iron in a crystalline state, and of preventing its transformation into persulphate. The first method imagined by Mr. Hoorn consists in this:—The salt is dissolved in a small quantity of water, heated for a short time, and then allowed to cool; whilst cooling, the liquid is kept in constant motion by means of a glass rod. In this manner the crystals that form are excessively small, and constitute a kind of crystalline powder. The latter is dried rapidly at the ordinary temperature of the atmosphere, and by pressing the salt between the folds of filtering paper. The crystalline powder thus obtained is inclosed in a bottle with an hermetic glass stopper, care being taken to fill the bottle completely. On account of the smallness of the crystals very little air can remain in the bottle when filled with the salt in question, and the latter may thus be preserved free of oxidation for any amount of time.

The second method proposed by M. Haakmann, of Rotterdam, consists in placing the crystals of protosulphate of iron in alcohol of a mean density, in the same way as we place potassium or sodium in oil of naphtha or petroleum. When we wish to employ the salt the crystals are withdrawn, placed for a moment in a cloth, and pressed two or three times between folds of blotting paper. The same journal contains an account of a new process for preparing gun-cotton and collodion by M. Bérard. The author attributes the frequent insolubility of pyroxyline in ether to the large mass of the cotton employed in the preparation of gun-cotton. He assures us that the cotton generally employed for this purpose may be advantageously replaced by the *débris* of cotton scraped off or cut away in the manufactories *(tontura di mollettone)*, which is in a state of greater division, and which may be added to a mixture of saltpetre and sulphuric acid; in this manner far more cotton is acted upon by the nitric acid, and two or three times as much may be employed to the same quantity of salt and acid. To 250 parts of sulphuric acid, 100 parts of nitrate of potash and 25 parts of *tontura* (refuse cotton) are added.

To prepare collodion, the author recommends that the gun-cotton, produced as above, should be heated gently in a retort upon a slow fire, with the mixture of ether and alcohol. By acting thus the substance is dissolved more rapidly, and the liquid takes up a greater quantity of pyroxyline than when collodion is prepared by the ordinary method.

A large fountain has been erected on the Place Louvois, in the Rue de Richelieu, at Paris. All the copper ornaments of this fountain have been produced by galvanism. The metallic parts of it appear to be of solid copper, but in reality they are merely coated with a layer of copper, by means of electricity. The work is attributed to M. Oudry, who has had considerable success, it appears, in this ingenious application. The substances to be covered with copper are generally of iron. It is necessary, before plunging them into the bath of sulphate of copper, to rub them with a peculiar substance discovered by M. Oudry, and patented in France and England. They are then immersed in a bath of sulphate of copper, and put in connection with the negative pole of a galvanic battery. After a certain period of time, they are covered uniformly with a coating of copper, that adheres perfectly to the iron, and may be produced to any thickness.

The Minister of War, Marshal Randon, has just issued a decree that reads as follows:—

"Art. 1.—All kinds of phosphoric matches are forbidden in the barracks, under pain of imprisonment.

"Art. 2.—The matches called '*hygieniques amorphes*,' which can only be lighted by rubbing them against a surface prepared to this effect, are alone allowed to be used.

"Art. 3.—Any person, civil or military, that shall introduce other kinds of lucifers, shall be punished."

The intention of the Minister of War is doubtless a good one. The only objection I can find to his decree is, that the lucifers termed *hygieniques amorphes* (and which might just as well have been christened by any other barbarous name), which are said to strike fire only when rubbed upon a peculiar surface prepared to that effect, *can* be lighted when rubbed upon any hard substance, such as stone, glass, &c.

M. Boettger has made known a new re-agent, which will, perhaps, become useful in the analysis of gases. It consists of strips of paper or cotton imbibed with chloride of palladium. These strips are suspended in any gas whose nature we desire to investigate. The gases which colour the chloride of palladium with which the slips of paper are imbibed, are oxide of carbon, proto-carburet of hydrogen (marsh gas), olefiant gas, and hydrogen. It is necessary that the chloride of palladium be pure, or, at least, as exempt from any free acid as possible.

Henri Rose has discovered that alkaline formiates have the property of transforming bichloride of mercury into protochloride, and if the formiate is employed in large quantities, the chlorides are reduced to metallic mercury. This reducing action does not take place if the solution contain any other chlorides at the same time.

The French possessions in Algeria have made the acquisition of a new and useful plant, the cultivation of which promises great success. It is the *wax plant of Cayenne*, known also as the *Goingamadon*. This plant furnishes wax in every respect similar to that which is at present procured from bees. Its cultivation in Algeria is neither difficult nor expensive. It is calculated that each plant, after attaining its ordinary growth, will furnish from 40 to 50lbs of wax.

THE ISLE OF WIGHT FROM A PHOTOGRAPHIC POINT OF VIEW.

To the Editor of the "Photographic News."

Sir,—As regards Ventnor itself, there is little for the photographer to do in it; but round about it there are many scenes of great beauty calculated to make admirable pictures. If it had been possible to have planted my camera at a sufficient distance right in front of the town, so as to have obtained a negative of the town itself, with the high hills at its back, I should have secured a picture superior to anything of a similar description I ever saw; and this would apply still more strongly to Bonchurch, but the difficulty of getting a sufficiently stable base for the camera on the sea rendered it an impossibility. I should imagine that out-door photographic operations might be continued here much later than in almost any other part of England, from the greater mildness of the temperature consequent on its sheltered situation. In the gardens may be seen the myrtle, and other tender plants, which survive in the open air all the year round; and it is this mildness of the temperature which has led to its being chosen as the winter abode of young and suffering invalids, many of whom have found a resting-place here from which they will never depart. By going along the beach from Ventnor to

Niton, many curious and pretty views can be obtained, which I value chiefly, however, on account of their uncommon nature; but the journey which I subsequently made from Niton to Ventnor along the highway gave me the most opportunities for getting pictures which were more attractive to the generality of the people. Occasionally, it was a fine house, almost buried amidst the foliage of the surrounding trees; then a cottage, which, with the accessories surrounding it, gave a most delightful picture, and this was hardly passed before I came to a landscape diversified by hedges, trees, and cattle lying about beneath their shade, to screen themselves from the burning rays of the sun. It was while taking a picture of a cottage along this road, that I met with a circumstance which showed me in an unpleasant manner the difference in the energy of rays reflected from objects of one colour, from the energy of rays reflected by objects of another. I had selected for a picture a pretty thatched cottage, partly hidden by the leaves of an apple or pear-tree, and having on one side of it a field of clover, in bloom, and on the other a small patch of what the woman called "chorlick." I am not strong in botany, and therefore cannot give your readers the scientific name of this plant; but it is a plant covered with brilliant yellow flowers, and showing scarcely any leaf. I exposed a plate, prepared by Fothergill's process, for the length of time which experience had taught me to be necessary on such a day and hour, and never doubted that I had been as successful as usual; but, on developing, I found that the negative was useless, in consequence of the parts of the plate on which the chorlick ought to have imprinted itself being almost entirely blank, whereas, the remaining portion was even more than usually good.

Niton is a pretty little village, which, like most other places in the Isle of Wight, is gradually extending itself. There was no object in the place which I thought worth taking beside the Sandrock Hotel, which is a very pretty building on the Undercliff, and the church, which is very picturesquely situated, and, apparently, is one of very old standing—almost as old as the family of the Hoglanders, who are said to have come to the island in the time of William the Conqueror. Though I could obtain no very striking pictures of objects in Niton itself, yet the country round offered many scenes of great beauty, many more than I, with the best will in the world, could afford to take just at that time, owing to the rapid manner in which the number of my plates was diminishing; not that there was any difficulty in getting a fresh supply sent to me, but that took time, and I could not wait at Niton until they arrived. There was one place I visited from here, and which I would recommend any of your readers who may follow in my footsteps to visit, and this was St. Catherine's Hill. It is rather toilsome work to reach the summit on a hot day, it being more than 800 feet above the level of the sea, but the view from it amply repays the fatigue. Not only can you see the greater part of the island, but also the New Forest, and a great part of Hampshire, and along the coast as far as Beachy Head. I had been told that I might even get a view of the more elevated parts of the coast about Cherbourg; but though the day was very brilliant, and I carried a good glass, I did not succeed in seeing what others tell you they have seen; but I certainly did get a view which I think it would be difficult to meet with in any other part of the United Kingdom. As I sat there, looking sometimes at the hill and dale, which extended for miles, and then at the bright green flashing sea covered with sails, I almost fancied I could hear in the wind—which was blowing strongly there, although not a breath of air was perceptible when I left Niton—the sound of the voice of the monk chanting, who is said to have formerly lived in a chapel erected here some 600 years ago, and whose duty it was to keep lights burning as a beacon to the ships—a purpose it must have accomplished in a very indifferent manner, if the climate of England were then what it is now, as the hill on which it stood is frequently enveloped in mists and fogs; so frequently, indeed, that, to make a lighthouse on that part of the coast of use, it has been thought advisable to erect it on a point of land much lower down. The man who lives in it is anything but indifferent to the sight of his fellow-creatures. I happened one day to be examining the lighthouse at the moment when a steamer, full of people, was coming along very close to the shore, and I could see him pull aside the blind to look out, and wave his hand vigorously to attract the attention of those on board.

From here, along the coast, there was not much to attract attention, until I reached a point called Rocken End. This is a long ledge of rocks which stretch far into the sea, and are almost covered at high water, the tide breaking against them with great force, especially when aided by a high wind. It so happened that the tide was just beginning to flow when we got there, so that I was able to get two negatives from different points of view before the sea had risen too high. I would advise those who can choose their own time for visiting this part to do so when the tide is running in, the roaring of the water among the rocks being very impressive. From this point, until I reached Black Gang Chine, I saw few views I considered suited for the camera; at the latter place, however, I was delighted by a spectacle, the like of which is not to be found in any other part of the island. Those who remember the description of the Chine published in my letter of last week, may imagine that this resembled it, but it did not in the least. The sides of Shanklin Chine were clothed in verdure, whereas the whole appearance of Black Gang Chine is one of barrenness and desolation. In this, as in the other, the stream of water which falls from the top is very thin, except after a heavy storm, at which time the whole thing is seen to the greatest advantage. The colour of the sides of the chine renders the photograph a more than ordinarily faithful interpreter of the scene, as it can be toned to a colour very closely resembling the reality, and it is in other respects admirably fitted for a photograph of large size. On the night of the day on which I was there, there was some exceedingly vivid lightning, and I was fortunate enough to see it under an aspect more favourable to the enjoyment of its peculiar beauties than falls to the lot of most visitors to the place.

From Black Gang I found it necessary to go to Newport, from which town I made two excursions to Carisbrooke Castle, which is only about a mile distant. Of course I took pictures of the entrance gateway and the two round towers which formerly defended it, and also of the remains of the building which still contains the window—or rather the stonework and iron bars, for the glass has disappeared—through which King Charles is said to have tried to make his escape and stuck in the attempt. The adjoining building, said to have been the governor's house, in which Charles was confined subsequent to his attempt, is included in the negative, but there is nothing very interesting in its appearance. It is inside this you see that travellers have indulged the mania for writing their names to its fullest extent. Every inch of the wall is covered with the names, and sometimes the addresses, of persons who have visited it, one lady from America having inscribed hers about ten times; others have added to their names a scrap of doggrel poetry like the following, written by an individual who modestly subscribes himself as the Queen's Osborne poet:—

> "Dear old Kingsland, though far from thee we roam,
> Yet me and old Chapman will soon be at home."

The inscriptions, though, which are peculiarly adapted to send a thrill of envy through the bachelor bosom, when he finds himself reading them alone and solitary on a bright sunshiny day, are those which inform all comers that Edwin and Emma Ringdove, or Edwin and Angelina Turtle, visited this place in the course of their wedding tour. Inscriptions like these are very numerous, and would seem to prove that the Isle of Wight is a favourite resort for newly-married couples; probably from their feeling that they will be more isolated from the world in a little island than they would be on the mainland.

The ruins of the keep make a very pretty picture, but the only way which I could perceive at the time by means of which it could be got at favourably, was from the upper window of a building facing it; but from what I remember of the appearance of the land surrounding the ramparts, I am inclined to think a better picture might possibly be obtained from the outside of the castle walls, which did not occur to me then. I do not think there is any other view than those I have mentioned worth taking, so the photographer, who will probably make a journey expressly from Newport, need not overburden himself with plates. He may, it is true, pay a visit to the village of Carisbrooke and take a negative of the church, which is rather a fine old building, but the interior of which is not worth the trouble of taking, more especially as it is disfigured by high pews, or boxes, of unpainted deal, or some other common wood.

I did not observe any building in Newport capable of yielding a picture with the exception of the church, and this, in the presence of so many interesting objects in the country around, is hardly worth the expenditure of a plate. As a country church it is certainly a very fine one, and the inhabitants of the Isle of Wight are justly proud of it; but the great attraction it contains is a white marble statue of the Princess Elizabeth, daughter of Charles I., by Marochetti, executed by order of the Queen. The expression of the youthful countenance is exceedingly gentle and pleasing, in which it agrees with the character which is given of her. She is represented in a recumbent position, with her head resting on the Bible—the position in which she was discovered after death. The sternest democrat can scarcely repress a feeling of indignation against Cromwell and his advisers for having shut up and suffered to pine to death in a prison a young and peculiarly gentle girl, whose only offence was that she was the daughter of her father. The statue would make a very pretty and interesting stereoscopic picture, and as I know I could have got permission to take a negative of it, I have no doubt that anybody, less idly disposed than I was just at that time, could do so likewise. There would be no difficulty on the score of want of light.

Not caring to remain in Newport, I took a conveyance to Mottestone, where I stopped to take a look at the church, which is a very old one, and rather picturesque in appearance, partly from its age, and partly from its having been built at different times. After this, I went on to Freshwater, where I remained for the night. The next morning I was stirring betimes, and before I breakfasted had taken four negatives, without moving any great distance, three of which included the church and other objects taken from different points of view. Finding there was nothing more worth taking, I had my traps carried down to Freshwater Gate, which is a better place to stay at than the village where I had slept, being open to the sea, and offering advantages in the shape of bathing, as well as in accommodation—considerations to which photographers are as sensible as other people. Moreover, there are several views about here which are very interesting, and among these, that of the place itself, which will furnish more than one good negative. My attempts to get a negative of some of the caverns which the washing of the sea has worn in the cliff were failures, which I ascribe to the dullness of the weather when I made the attempt. I was more successful, however, in the case of the cavern called Freshwater Cavern, which is of considerable size; the entrance being, I imagine, about 40 feet in height, and the cavern itself extending a good way into the cliff.

I also tried to get a picture of some rocks which rise from the sea at a short distance from the beach, but was not successful. The dry process is of no use as regards water in motion, and even with the wet collodion process I have never been able to get pictures of the waves at all comparable with those exhibited by you at the South Kensington Museum.

I must now conclude this second letter; and in a third I will endeavour to conclude the account of my wanderings in the Isle of Wight. Iota.

Photographic Societies.

The French Photographic Society.

At the last meeting of the French Photographic Society the chair was taken by the President, M. Regnault, who, after certain routine business had been disposed of, announced that, with the permission of the Minister of State, the Photographic Exhibition, which had been even more successful than they had hoped, would remain open until the 31st August, and consequently the Report on the Exhibition could not be presented until after the vacation.

MM. Davanne and Girard have addressed the following letter to the Society:—"M. President,—Have the kindness to receive and present to the Society our thanks for the honour done us in the award of a gold medal at the last meeting. Though our studies on positive proofs are far from complete, the Society has given us a handsome recompense as an encouragement. We still continue our labours, which will probably occupy us for some months longer, those in course of execution leading us to hope that we shall attain the object in view—the uniformity and permanency of positive proofs."

The President requested that those persons to whom the Society had awarded medals at its last sitting would call for them at the secretary's office.

M. Poitevin presented a proof printed on paper with printing ink in July, 1855, also of a series of photographic proofs pulled at different epochs of the application of the process. To these he added some taken by his gallate of iron process. The proofs were handed over to the Luynes commission.

MM. Salmon and Garnier handed in a paper on their printing process by the deposit of carbon on sheets of paper impregnated with sensitive substances, and on divers heliographic processes on metals and stone, together with specimen prints; which were likewise sent to the Luynes commission.

M. Pretsch, of London, forwarded a fresh series of proofs and plates, obtained by his photo-galvanographic process. (Sent to the Luynes commission.)

M. Berchtold read a paper on the process of heliographic engraving, communicated by him at the last meeting, and illustrated it with proofs and plates prepared by him. He received the thanks of the Society for his communication, which was forwarded to the commission.

M. Asser, of Amsterdam, sent a note on his process for transferring on stone or metal photographic negatives on paper prepared with lithographic ink, also some proofs obtained by it. (Forwarded to the commission.)

M. Lafon de Camarsac read a paper on the subject of his processes for obtaining photographic pictures, similar to that which we published some weeks ago. The paper, together with proofs and specimens, was forwarded to the Luynes commission.

M. Civiale presented the following remarks on the diminution in the time of exposure necessary in the waxed paper, and dry albumen and collodion processes:—"I have been led to make the following experiments from remarking the rapidity which is communicated by the presence of free nitrate of silver on the surface of humid paper, and I have endeavoured to put the waxed paper (after its exposure to the light) pretty nearly in the same condition as humid paper; and the same also with respect to the dry albumen and collodion, by comparing them with wet albumen and collodion. The preparation of the waxed paper was the same as I described last year. The sensitised paper, being properly washed and dried, was exposed from two to four minutes and a half. This result was obtained by plunging the proof after exposure in the sensitising aceto-nitrate bath. The proof remained completely covered for ten seconds, when I transferred it to the gallic acid bath.

Distilled water	1,000 parts.
Gallic acid	3.5 „

The proof was completely developed in a very short time. Dry waxed paper thus treated, presents the advantages and drawbacks of wet paper—greater rapidity joined to a little more hardness and instability in the results, especially in dull weather. I believe the greatest precautions are necessary to avoid spots; the dishes should be scrupulously clean, and the paper carefully selected and recently iodised. I have not been able to get good negatives with paper that had been iodised more than two days. Possibly some improvement might be made in the bath, and other processes than that I have indicated might give equal rapidity. As to the dry albumen and collodion by wetting their surfaces, after exposure in the silver bath, the rapidity will be nearly equal to the wet process."

M. Regnault thought it was dangerous to employ silver in the development, it gave a hard appearance to the negative.

The Abbé Laborde offered some remarks on the experiments made by M. Niépce. (See p. 289.)

At the conclusion of this communication, M. Regnault observed that the phenomenon indicated by M. Niépce may be of a very complicated character; for example, the paper itself might intervene by its proper substance. He believed that the following experiment would be necessary to demonstrate the exactness of M. Niépce's hypothesis. The interposition of a lens of short focus between the two surfaces, to concentrate the rays on a single point: in this case, the concentrated rays ought necessarily to act with much more energy. It was to be presumed that the action was due to the proximity of the two surfaces rather than to a luminous radiation.

The thanks of the Society were given to M. Laborde.

A note, of which the following is the substance, was also communicated by the same gentleman. He had often observed a fact, which had, no doubt, attracted the attention of other photographers; which was, that if, after having focused with a small diaphragm, this diaphragm be removed, and the object glass left with its entire opening, the image becomes confused, not only for reasons already known, but also because the ground glass is no longer at the focus; to obtain all the requisite sharpness it will be necessary, under these altered circumstances, to approximate the glass slightly towards the object glass. The only way in which this information is useful to photographers is in cautioning them of the necessity of focusing afresh when they remove a small diaphragm after having taken an object, to use the entire opening to take a second picture of the same object with greater rapidity.

M. Bertsch presented an improved double object portrait lens on the part of M. Voigtlander, also "a small orthoscopic objective for the stereoscope, giving with a focal distance of 11 centimetres a half-plate image, the lines of which undergo no flexion on any part of the field."

Mr. Woodward, of Baltimore, presented a note on the subject of his solar camera, which was read, and the thanks of the Society accorded to him for it; after which the meeting was pronounced at an end.—*Condensed from the Bulletin of the French Photographic Society.*

Miscellaneous.

◆

Photographs of the Cartoons.—When the art of photography first began to attract attention, rather extravagant expectations were formed by some of its votaries as to the triumphs which it was one day to achieve. It would, it was said, drive painting—at least the painting of portraits and landscapes—out of the field. It must be now generally admitted that such a notion as this was very greatly exaggerated. A fine art can never be expelled by a mechanical art, and, in spite of all that has been said in its favour, photography is essentially of the latter kind. In the fine arts, taste and imagination, are the prime requisites—in the mechanical, judgment and technical skill. And though in photography there is some room for the display of taste in the selection of subjects and points of view, there can be no doubt that skilful manipulation and close observation of physical phenomena have much more to do with success. It is the privilege of the fine arts to defy, in a certain sense and to a certain degree, the attacks of time. As a beautiful painting fades, as a stately building crumbles into ruin, as a graceful statue becomes discoloured or mutilated, each seems to acquire, from the decay which it has suffered, a new and nameless charm. The spirit of the fashioner seems to reveal itself with new force and purity, in proportion as the material of the thing fashioned perishes. In photographs there is nothing of this kind. They must be fresh, and sharp, and clean; and the age which robs them of these qualities can give nothing in their place. Not only, however, did some of the vaunters of the art of photography forget the imperishable distinction between the fine and the mechanical arts, but they were, and indeed still are, fond of attributing to their pet pursuit a quality which belongs to it only with important limitations. Photography, it has been repeatedly said, must be true. The fact is, that it would be nearer the mark to say that it must be false. It is false in two ways. Objects at different distances are unequally represented, and lights and shadows are exaggerated. The former of these imperfections may, indeed, be reduced to a very inconsiderable quantity, but it nevertheless always exists; and, wherever minutiæ are of importance, it will operate disadvantageously. The distaste, therefore, which most persons feel for photographic portraits, and which has become an almost proverbial illustration of human vanity, is, in fact, a well-founded distaste for a real misrepresentation. But, though the capabilities of photography, as generally happens with a new invention, have been sometimes rated too highly, it is impossible to deny that it is a very valuable and important discovery. It is true that the higher kinds of painting have nothing to dread from such rivalry, as has been imagined, but it is no less true that photography is sometimes a useful substitute, and frequently a useful ally. A daguerrotype may not be equal to a good miniature, but it is much better and much cheaper than a bad miniature. In landscape, too, there are some respects in which the artist cannot hope to rival the photograph, as, for instance, in the representation of the forms of mountains and complicated masses of rock, photographic transcripts of which are not only beautiful in themselves, but very valuable aids for artistic study. Of all the applications of the art of photography, however, the most unimpeachable is its employment to secure fac-similes of perishing inscriptions, engravings, and paintings. Here the surface is flat, and there is consequently no difficulty as regards the focus; and we can rely upon an absolute fidelity to which the labour of man, however conscientious and however well-meant, can never hope to attain. It is probably no exaggeration to say that the most successful and striking instance of this application of the art which has yet been seen is the series of copies of the cartoons which has been recently executed by Messrs. Caldesi and Montecchi, and published by Messrs. Colnaghi. Three sets of different sizes have been issued, of which, if we are not mistaken, the largest was displayed at the Photographic Exhibition in Suffolk-street, last winter. Besides these three sets there is a series of heads of the size of the originals, in which Raffaelle's manner of working can be conveniently studied. Of the three editions of the entire cartoons, the largest set gives the best notion of the originals, as in the more reduced impressions something of the breadth and grandeur of effect seems to be lost. On the other hand, the latter are rather more portable and convenient, and are, of course, just as correct. Whichever set is selected, the lover of art cannot fail to feel the highest gratification at being thus enabled to investigate at leisure these acknowledged masterpieces. It has often been said that a painter cannot be fairly estimated by his oil-paintings alone, and that, to estimate properly the grandeur of design of which he is capable, his frescoes and works in distemper, if he has executed any, must be taken into consideration. Certainly, if it were not for the cartoons and the decorations of the Vatican, we should form a very inadequate notion of the genius of Raffaelle. Never till now, however, have the wonderful variety, power, and beauty of the former been fully revealed. Often as a person may have looked at the originals, we venture to assert that he gains a new sense of their excellence in contemplating these photographs. This is not only because they can be examined more closely and carefully than the originals, but because they seem, in fact, to have acquired a force and freshness which the latter want. The truth appears to be that the very tendency to exaggerate light and shade which is the main defect of the process when applied to copying nature, is for such purposes as the present the very thing that is wanted. All that is requisite for the felicitous reproduction of faded and injured works of art, like the cartoons, is a sure and proportionate intensification of light and dark; and this is precisely what is produced in photography. The cartoons seem accordingly to have been submitted to a Medean bath, and the figures come out young and fresh—the expressions of the countenances especially having acquired a character which, if it can be traced, as it doubtless can, in the originals, does not at any rate declare itself so plainly. Something is perhaps due to the fact that they are here upon a reduced scale, as the same relations of light and dark would naturally appear less inadequate when upon a small scale than when upon a large one. There does seem, however, to be, apart from this, a real restoration, which can only be attributed to the exaggerative tendency of the process. The cartoons have been so often discussed and described, that it would be superfluous to dilate here upon their merits. It may safely be assumed that no change of taste can now lessen the esteem in which all competent judges hold them. It is, however, curious to find that, at no very remote time, they were criticised in a spirit which is now obsolete. There is published in the collected edition of Sir Joshua Reynolds's Works a paper which he contributed to the *Idler* upon false criticism. He gives an account of a visit which he and a professed connoisseur paid to the cartoons, and describes the sort of comment which the latter passed upon them. "What a pity," he exclaimed, "that Raffaelle lived before the art of contrast was discovered! What an addition to the nobleness of St. Paul's figure could he have given had the art of contrast, and, above all, the flowing line which constitutes grace and beauty, been known in his time! You would not then have seen an upright figure standing equally on both legs, and both hands stretched forward in the same direction, and his drapery to all appearance without the least art of disposition." Of "The Charge to St. Peter" he remarked "Here are twelve upright figures. Now, if Raffaelle had been acquainted with the pyramidal figure, he would have contrived the figures in the middle to have been on higher ground, or the figures at the extremities stooping or lying, which would not only have combined the group into a pyramid, but would have given contrast." This anecdote had probably no foundation in fact, but it serves to show that this kind of criticism was in vogue, and the cautions upon this head which Sir J. Reynolds gives in his lectures prove the same thing. The cartoons are happily no longer necessary to aid in freeing popular taste from such æsthetical red tape as this; but the impressions which Messrs. Colnaghi have published are not the less valuable. They will be exceedingly useful to artists, and exceedingly interesting to every person of cultivated taste. Most children first acquire a notion of, and a taste for, art from illustrations of Bible history, and those illustrations will henceforward be, in many cases, the masterpieces of the greatest of devotional painters.—*Saturday Review.*

The Archer Fund.—The sum subscribed for the benefit of the family of the late Mr. Archer amounts to about £640; to this must be added a pension of £50 a-year granted by Her Majesty out of the civil list. Sir William Newton is endeavouring to obtain a parliamentary grant of £100 a-year in addition, so that each of the ladies may be ensured an annual income of £50; which he considers to be the least they have a right to expect, seeing, as he affirms, that their father's discovery of collodion saves the country £30,000 a-year. The subscription list is still open, if any of our readers are desirous of contributing to the fund.

The Art Union of Manchester.—The idea of Manchester, which the generality of people entertained until recently was, that it was a city of factories enveloped in smoke, where steam-engines filled the streets with a continual roar, and the mass of the inhabitants of which held strong opinions as to their political rights, and were, in consequence, regarded with a species of horror by the quiet dwellers in country towns. However, the attendance of the people at the Fine Arts Exhibition of the past, and the existence of an Art Union in the present, are proofs that those in that city who are not included among "the upper ten thousand," have a taste for art as well as for politics. Besides the usual engravings and the other advantages which the Art Union of London offers, the Manchester Art Union proposes to add a certain number of choice photographs for distribution among their subscribers, and to ensure that the photographs shall be good ones, they request that photographers who may be able to comply with the conditions specified in an advertisement which appears in the current number of the "Photographic News," to forward specimens to the secretary. Probably there is no art whatever which is practised so extensively, for the mere pleasure of practising it, as photography. Still there are a vast number of photographers who, if they do not seek to sell their productions under ordinary circumstances, would be happy to do so when the transaction is so extensive as the present promises to be, and it is therefore with considerable pleasure that we call attention to the action of the Manchester Art Union in this matter, which we think is calculated not only to give pleasure to their subscribers, but to encourage an art that, though of continually increasing importance, is of all others the least encouraging in a pecuniary point of view.

Photographic Notes and Queries.

NEW DRY PROCESS.

Sir,—I was by no means agreeably surprised, on receipt of your No. for the 12th inst., to see that a "Friend" (vol. ii. p. 275,) had indiscreetly entrusted you with mems. touching a process which I have been expounding and communicating to several, during the last two months; and which, being apparently so slight a modification of Fothergill's process, I really wished more fully to elaborate before I *rushed* into print. I recognise the style of your correspondent, and feel certain he has not in any way experimented with it; his description of it is very inaccurate, and his deductions wide of the mark. Syrup, of the density he mentions, would act in a manner totally the reverse of that intended. I never said that "nine batches" of plates had been prepared; but, that, out of nine plates from different batches, I had met with no failure which could be ascribed to the process. Far from "the negatives not being as dense as usual," I had the pleasure yesterday to see a copy of an engraving, the especial beauty of which consisted in the perfect density of the spaces which were white in the original, and a certain peculiar sharpness of outline which is rarely reached in wet collodion.

Allow me now to describe the process more minutely than "Amateur," and if there be any virtue in it, your readers may judge for themselves by experiment; if any praise be due, they will know to whom to award it.

1. The collodion I have used is the same I have long made and sold for the ordinary wet process; and the bath the usual nearly neutral 30 grain, saturated with iodide of silver.

2. After exciting a plate (say stereo size), place it on the level stand, and pour over it 6 drachms of the following solution—(lump sugar, 1 drachm; pure water, 1 ounce). Effect this with one sweep of the hand, so that the liquid shall flow over in one unbroken wave, and let it remain at absolute rest for one minute; the liquid being then caused to move to and fro repeatedly over the plate, is to be poured off, and replaced

3. By 4 drachms of prepared albumen, made by agitating, in a bottle, 1 ounce of albumen, with 3 ounces pure water and 5 minims liquid ammonia, sp. gr. 880, allowing it to settle 12 hours, then filtering through paper.

The object in adding the sugar to the washing water is to render the latter somewhat denser, so that the portion of bath remaining in the pores of the collodion, which, independently of gravity, appears to exhibit a sort of repulsion for plain water, and their potation in general, may have its yearning for union with a more generous liquid readily satisfied; which is the case if it be allowed to rest undisturbed for a short period, as above described.

4. The albumen must be allowed to remain on the plate whilst another is being coated and immersed in the bath, and then

5. Washed off with 1 pint of common water.

6. The plates are to be allowed to drain and become nearly dry with the *inferior* angle supported on blotting paper, resting on glass; the *superior*, by a piece of white pine wood, appropriately serrated, and nailed at the proper height against the wall. Perfect desiccation must be effected by the aid of low artificial heat, radiating from any appropriate

source, *e.g.*, a chamber of hot water, or a heated brick wrapped in blotting paper.

7. I consider the exposure to be about five times as long as wet collodion—half a minute is sufficient for an object, 50 yards distant, well illuminated by the sun. Lens, a double combination, 5-inch focus with a stop, $\frac{3}{8}$-inch between the lenses. The reproduction above mentioned occupied 22 minutes, as against 5 with wet collodion.

8. Before developing, plunge for half a minute into distilled water, then place on level stand, and

9. Pour over the plate 4 drachms of the following:—1 grain usual pyrogallic solution, 6 parts saturated gallic acid solution, 1 part mixed at the moment of use with 1 per cent. of a 30-grain nitrate of silver solution, in a glass measure, perfectly clean and free from scratches. The addition of gallic acid renders the development somewhat more tardy, but this is abundantly compensated for by the liquid remaining so much longer bright and the diminished tendency to stains.

10. Within 5 or 10 minutes all the detail of the picture will have appeared, provided the exposure has been sufficient; but the density will be but small; any amount of the latter may be obtained by using a new quantity of developer mixed with 10 drops or more of silver solution.

11. I invariably fix with cyanide, 5 grains to the ounce, finding that it does its work in a more cleanly manner than hypo., and has no tendency to insinuate itself under the film in places where it may have been scratched off the edges, &c.; a fault to which the latter is much addicted.

12. With respect to the remedies against blisters and peeling off of the film, I cannot say much, not having been troubled therewith. I believe them to arise frequently from an inappropriate collodion being used, but more generally from careless manipulation; that above mentioned being a very grave source of peeling; frequent raising of the plate perpendicularly on its edge has a great tendency to favour this. Much stress is laid by some writers upon the difficulty of inducing cleanliness in the plates to be used for this purpose, and the dire results supposed to follow from want of this *approximate* to godliness. I am not of their opinion; their failures evidently proceed from other causes. I differ from them also, totally, in their belief that smearing them over with albumen is a mode of keeping either these or the bath clean. Let the plates be first well washed in solution of cyanide, well rinsed in water, and dried; then, just before using, smeared over with a thin cream, consisting of tripoli, proof spirit, and a little ammonia, and the same subsequently buffed off; and I will answer that dirty plates shall no longer be reckoned among their stock grievances.

13. This process appears also likely to solve the difficult question of the manufacture, on the large scale, of transparencies for the stereoscope. I have made a few experiments thereon with the happiest results. Almost any tint in the deposit may be obtained by the judicious dosage of the gallic acid solution. The negatives employed should be slightly over-exposed, and not too dense in any part. The exposure in pressure frame is 2 seconds, to moderately good diffused light.

J. B. Hockin.

38, *Duke Street, Manchester Square.*

NEW DRY PROCESS.

Sir,—In my letter of last week (*ante*, page 275), there is a mistake which requires correction. The syrup may be prepared with one ounce of sugar to one of water, as stated by me; but in that case, it should be diluted to the consistency of one drachm of sugar to the ounce of water. This proportion has been found to act well, but perhaps one measure of syrup to three of water may be quite as good.

I shall feel obliged if those who try this process will report their opinion of it, or communicate any modification which they have tested, and found to be an improvement. By so doing, they will be aiding the advancement of an art which can only attain perfection by such means. The idea of interposing a delicate layer between the collodion and albumen is a happy one, and I trust this new process will prove as successful in the hands of photographers in general as it unquestionably has in those of its author.

An Amateur.

CONVERTING POSITIVES INTO NEGATIVES.

Sir,—The remarks of Mr. Hardwich, in one of your recent numbers, relative to the comparative value of the processes for strengthening negatives, induce me to write to you to add my confirmatory experience of the value of the process favourably alluded to by Mr. Hardwich, and originally introduced by MM. Barresville and Davanne, viz., that in which iodine is employed for reproducing the iodide of silver, and pyrogallic acid is used in strengthening. I called attention to this process in one of your contemporaries in May, 1857; since then I have always employed it when I have required a negative, and with uniformly good results. I also know several photographers who find it very valuable to them. One of them has informed me that, previously to using this process, he had to expose often 15 to 30 minutes to obtain a good negative of machinery, &c., in badly lighted rooms, and now a minute or two produce him a positive picture, that yields a beautiful negative, by this mode of treatment. I inclose you a print from a converted positive, obtained in this way, and you will see the advantages of having a process you can depend upon, when you have such subjects to take. I can, therefore, strongly recommend this process to any who require to obtain negatives of objects in a bad light, or when the exposure for an ordinary negative would be too long to obtain a satisfactory result, from the objects moving (as children, animals, &c.). The formulæ and manipulation I use are as follow:—

After fixing and washing the positive picture (which should be fully developed with the iron solution), *thoroughly dry it.* This is to prevent the film coming off in the after washings, &c. Then moisten the film well with water, and pour over some of the following solution:—compound tincture of iodine, 2 drachms; distilled water, 8 ounces; pour the same quantity on and off the picture for a minute or two. In some collodions, or with some developers, no change is observable here, in others a pale primrose iodide covers the "whites" of the image. Well wash off the iodide solution with water, and expose the plate to the light for a short period, say 30 to 60 seconds; return to the dark room and pour on some of the following:—

Pyrogallic acid	2 grains.
Citric acid	1 grain.
Distilled water	1 ounce.

When the plate is well moistened with this, pour it back into the measure and add a few drops of solution of nitrate of silver, 30 grains to 1 ounce. This should not be from the ordinary nitrate bath, or specks will probably be the result. Pour this same mixture of pyrogallic acid and nitrate of silver on and off the plate as in developing a negative, till the picture is dense enough, of course using a fresh quantity, if the first lot gets very much decomposed and discoloured. My only excuse in troubling you with these remarks is, that I consider, from the experience of others and my own, that this process for strengthening negatives, or converting positives into negatives, is so good that it needs only to be known to be generally adopted.

Robt. John Fowler.

NOTE ON THE DEPOSITION OF DEW.

Sir,—I am no photographer, but I have taken the "News" from the first, and reading in a recent number your foreign correspondent's extract from *Le Cosmos*, the idea struck me that the phenomenon there mentioned might be similar to one I have often noticed, with the difference only between dust and dew. The season is now approaching when, if you are a tolerably early riser, you may, any morning you choose to go out, see, by the deposit on fences or any other erection of wood, the arrangement of the frame-work supporting the erection as clearly as if the framing were uncovered. C. R. Plant.

DETERIORATION OF GUTTA PERCHA ON KEEPING.

Sir,—As you are now writing on gutta percha baths, I think it would not be amiss to mention my experience with one. I made one of sheet gutta percha in March, 1857, which answered very well till a few weeks ago, when it sprung a leak, which I could not find without taking it out of the mahogany case, and when I attempted to do so it broke all to pieces. I then looked for a piece of the new sheet it was made from, and that was just the same—as brittle, but not so strong as glass. Have any of your correspondents experienced the same? I ought to state that I only used it a few hours once a week. Henry Mitchell.

MARBLINGS IN THE FOTHERGILL PROCESS.

Sir,—The water marks or marbling in Fothergill's process are produced by the mode of washing off the albumen, and will mostly be found when it is washed off under a tap or jug. A metagelatine plate, unwashed, will never show them; but wash off the metagelatine as above, and you will frequently meet with them. Washing in a dish entirely prevents them, if sufficient water is used: 1 oz. of albumen to 5 ozs. of water is quite sufficient. Success.

QUERY ON COLOURING PHOTOGRAPHS.

Sir,—Can any of your readers inform me what chemical process will produce the bronze shade on the extract of safflower, as it would be most valuable for colouring stereograms? G. R. G.

ANSWERS TO MINOR QUERIES.

Wet Collodion for Interiors.—Mr. Russell Sedgfield, on whose beautiful productions we have had on more than one occasion to offer some remarks, suggests a process by means of which wet collodion may be employed for interiors. The chief objection to the use of this process for interiors is, that, in consequence of the lengthened exposure required, the nitrate of silver dries on the surface and produces stains. To overcome this drawback he prepares a bath of ten or twelve grains of nitrate of silver to the ounce and nearly saturates it with acetate. On removing the plate from the usual bath, he places it in this for several minutes. For developing, he uses a pyrogallic acid solution, of two or three grains to the ounce. The development occupies a longer period than in the case of a plate prepared in the ordinary manner in one bath only, except when the exposure has been a very long one, viz., from ten to fifteen minutes. The advantages claimed for this modification of the wet collodion process are, the diminution of risk of stains and the power of giving a longer exposure with safety. The collodion Mr. Sedgfield recommends for interiors is one that is a medium between the tough and powdery: a condition he obtains by the addition of cotton and alcohol to the collodion supplied to him. It should be newly mixed for interiors, and iodised with a mixture of cadmium and potassium.

Expense of Toning with Gold.—A toning bath used in the way we recommend, viz., *before* fixing, but after removal of the free nitrate of silver from the print, will tone properly about 200 square inches for every grain of chloride of gold which has been added to it; and the expense of chloride of gold being about two pence per grain, it will be seen that the real expense of gold toning does not exceed one penny per 100 square inches. This being the case, no photographer who really values his productions should run the risk of having them fade, owing to an erroneous impression of the costliness of a properly made toning bath.

TO CORRESPONDENTS.

A. Taylor.—1. Many thanks for the note respecting the injurious effects of the washing waters on plants: the letter from a correspondent, which we published in our last number, renders further notice on this point unnecessary. 2. We will communicate the query to our correspondent, who, doubtless, will render every information in his power. 3. An excellent composition was given in our first volume; a reference to the index will at once show you where it is to be found. 4. They should be well washed immediately they are taken from the printing frame, and then immersed in the toning bath; from the colour of your print, we fancy that your toning bath is not in good order.

Excelsior.—Did you wash the plate well after developing, and before fixing? If cyanide fixing solution is applied immediately after an iron developing solution, blue stains are frequently formed, owing to the reaction of these two solutions occasioning the formation of Prussian blue. Blue patches may also be produced by using too acid a developing solution, or too thinly iodised a collodion.

Enquirer.—The occurrence of "pin-holes" in collodion negatives may arise from many causes; the most common are—the bath being over-saturated with iodide; this is remedied by adding a few ounces of a 40-grain solution of nitrate of silver; the collodion being used too soon after iodising, and before it has quite settled. A potassium collodion is peculiarly liable to this fault.

A. L. A.—The picture sent is by no means a bad one: if anything, a little less exposure might have improved it. Some of the foggy appearance may be due to the lens, which, owing to the number of reflecting surfaces, and the long time it requires to produce an action, is very liable to produce the effect of fog. You may obtain darker tones by printing deeper, and keeping longer in the toning bath.

A. Burr.—We do not think that you can get any double combination lenses with mountings much lighter than the old-fashioned style: in this respect the optician and brass mounter is far behind the cabinet maker in rendering the apparatus sufficiently light and portable for the present race of amateur photographers. A light and rigid substitute for the usual heavy brass mount is much wanted.

Dr. O.—The reduction is owing to the charcoal which you placed in the solution. It is an old experiment to place a stick of freshly-burned charcoal in a solution of nitrate of silver, in the dark. In about a week's time, metallic silver will be seen to be reduced on the charcoal, either in the form of a bright coating, or in long needle-shaped crystals.

Optical.—We presume our correspondent means *refracting* stereoscope when he speaks of a *refractory* stereoscope, although the latter term would be very applicable to some of the cheap instruments now to be met with. Professor Wheatstone was the inventor of the refracting stereoscope as well as the reflecting instrument.

In a Fix has a stock of negative collodion which he wishes to convert into positive. The most advisable plan will be to add tincture of iodine until the collodion assumes a full yellow or reddish tint; and if the intensity of the positives should still be found too great, add nitric acid to the bath, drop by drop, until it works properly.

F. L. M. M. (Devon.)—One or two drops of canada balsam in an ounce of spirits of turpentine will make a very good varnish for pouring over collodion positives before colouring them. If the colour *bites* too deeply, add more turpentine.

A Member.—We must decline taking any part in such proceedings. They will not add much to the credit of either party, and our advice would be to stop at once.

Halcyon.—The plate should be *well* washed, or the picture will fade. By using a collodion specially prepared for the purpose, the film will not wash off. You will see advertisements to that effect in our advertising columns.

Henry.—Iodoform diminishes the intensity of collodion, and prevents the proper formation of the half-tones of the negative. For this reason we think its employment injudicious.

William F.—It is imprudent to mount positives with paste, as this substance has been shown to exercise a very prejudicial effect upon the stability of the photograph. Thin glue, applied hot, will be far preferable.

F. R. S.—The article referred to has not yet appeared in any English journal. It would be too heavy and uninteresting for insertion in full in our pages: we may, however, give an abstract of the article.

A Calotypist.—More acetic acid is required in the exciting and developing solution. Do not excite with gallo-nitrate, but only with aceto-nitrate of silver.

T. P.—1. The metallic spangles are caused by the presence of too much nitric acid in the developing solution. 2. Your prints will probably be rendered darker by ironing them in a rather damp state.

J. B.—We are not aware of the existence of any patent which can prevent you taking pictures on ivory.

Collodion.—Your collodion is too thin: allow longer time to elapse before it is poured off the plate, or use a thicker collodion.

H. M.—See M. Le Grice's paper in the present number. Your bath seems as if it were alkaline; add a little dilute nitric acid to it.

J. T. B.—We will communicate the query, and, as soon as we receive an answer, will give the desired information.

R. H. W.—One drop of nitric acid added to one ounce of water. Add this solution to your bath in quantities not exceeding one drachm at a time.

Beginner.—1. Use a slow collodion containing free iodine. 2. No. 3. We cannot answer such questions.

Adeline.—If our fair correspondent will send us her portrait, we will say whether we think photography the best employment for her spare time.

Querist.—Apply to a card maker or wholesale stationer, who will *hot-press* your pictures at a moderate expense.

Janet.—Your query was answered in one of our previous numbers.

Y.—Use a solution of gum damma 3 drachms, in mineral naphtha 3 ounces.

Mart.—The effect you describe cannot occur if pure chemicals are used.

H. S. I.—Received with many thanks. A proof will be sent in a few days.

M. and H.—Received.

Communications declined with thanks.—A. B. C.—Q.—A Beginning.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbers of the "Photographic News:"—B. L. N.—Correspondent.—In a Fix.—B. T. O.—Abra.

In Type:—Sir J. F. W. Herschel.—A. Watt.—H. M.—A. R. P.—G. A. M.—H. and J. Walter.—W. H. Burnand.—C. H. Paine.—B. M. Brackenridge.—M. A. Root.—J. S. Overton.—G. R.—Knostlan.—W. L.—G. H. W.—I. W. W.—F. Debenham.—X. X.—H. M.—Inquirer.

Cases for Binding Volume II. have been prepared, price 1s. 6d. each. Subscribers may have their copies bound by the Publishers, in the usual manner, price 2s., including the cloth case.

*** All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

THE PHOTOGRAPHIC NEWS.

Vol. II., No. 52.—*September* 2, 1859.

The Second Volume of the "Photographic News" is concluded with the present number. Twelve months have elapsed since we entered on the publication of this new periodical. Several authorities predicted our failure, from the fact of our serial addressing only a limited section of the public. Fortunately, we were sufficiently confident in the soundness of our opinion on this point, as not to be deterred from our purpose by any sinister forebodings as to the probable result of our attempt to establish a new medium of communication with the great body of photographers; still there was, naturally, a feeling of some anxiety connected with the undertaking, lest we might have formed an erroneous estimate of what was required at the present day by the particular class we addressed. We are now enabled to speak with the confidence inspired by facts, and it is with real pride and pleasure that we inform our readers that the excellent position the "News" assumed at its very commencement has gradually strengthened, and that it continues steadily to progress in the estimation of photographers. Within a month after its foundation it had taken the foremost place in photographic literature; since then every month has seen a large additional increase in the sale in this country, and the slower, but equally certain, growth of the circulation in our colonies, in India, and, to some extent, on the Continent. We mention these facts for the purpose of expressing our grateful acknowledgments for the support we have received; at the same time, we cannot refrain from pointing out that our exertions have not merely been of service to photographers, but have tended to raise the character of photography in public estimation. Before the establishment of the "Photographic News" the public were almost entirely ignorant of the position to which photography had advanced, or that its importance was such as to require a journal devoted to its interests. The editors of newspapers ignored the existence of such periodicals, and it was not until this journal made its appearance that they recognised the fact by frequent quotations from its pages; thus proving that the "News" had done what other journals of similar character had failed to do, viz.: made photography a subject of interest to the public generally.

With respect to the character of its contents, we may leave that to the judgment of our readers, merely observing that while we have never failed to record every incident connected with photography in England likely to interest them, we have always endeavoured to keep them well informed on matters of science and art occurring on the Continent—which knowledge would not be likely to reach them through any other channel—by engaging the services of one of the most distinguished *savans* in France; we have also opened our columns to communications from correspondents to the fullest desirable extent.

As regards the future, we propose to continue the series of articles under the head of "The Amateur Mechanic," the letters we have received from many of our readers demonstrating that they are received with favour. In addition to this, and in order to make the "Photographic News" of greater value to beginners, several valuable series of articles will be introduced into the new volume, by means of which they will be readily enabled to master the preliminary difficulties of the art. A second series of "Lessons on Chemistry" will be commenced, which, being fuller and more comprehensive than those formerly given, will be equally useful to our old and new subscribers.

In conclusion, we cannot omit to express our warm acknowledgments to those eminent photographers who have, both privately and otherwise, favoured us with suggestions calculated to be of service to those practitioners who have not yet acquired an extensive acquaintance with the art; and also to those who have favoured us with information on minor matters of interest to the readers of the "News." We have pleasure in expressing our obligations to our correspondents, and trust that these kindly communications may be continued in the future as in the past—a repertory of valuable information; and that while we labour zealously to maintain the reputation of the journal intrusted to our charge, we may continue to receive the assistance of all who are interested in the progress of photography, and who are desirous of fully investigating the bearing which kindred sciences may exercise upon it. It will ever be our object to give the utmost publicity to every new discovery and to every important improvement, and thus to render our serial the veritable organ of Photographic News.

DESCRIPTION OF A PLAIN OR WAXED PAPER PROCESS IN PHOTOGRAPHY.

BY JESSE MITCHELL, ADJUTANT 1ST NATIVE VETERAN BATTALION.

The following paper, extracted from the reports of the Madras Photographic Society, will form a valuable addition to the paper on a similar process from the pen of Mr. W. H. S. Crawford, given in a recent number:—

So much has been written on the paper processes that the subject would appear to be exhausted. Nevertheless, a good paper process, easy to manipulate, and applicable to all situations, appears to be still a desideratum. I have, therefore, at the request of our Honorary Secretary, undertaken to describe my mode of operating, and, I believe, that any one who faithfully follows these directions will, after a little practice, find no difficulty in producing, at least, tolerable negatives. Skill in photography, as in any other art or science, is only acquired by practice, and no reasonable man should feel annoyed if, in his first attempts, he fails to produce as good pictures as they can do who have practised assiduously for many years.

This process is a modification of the original waxed paper process of Le Gray, but it is equally suited to unwaxed papers. As the manipulation of unwaxed paper is much the easiest, and the results so much alike that the operator himself cannot, after a time, say which was taken on waxed, which on plain paper, I shall confine myself to a description of the latter process, giving afterwards such additional directions as may be necessary to adapt it to waxed paper.

In photographic operations, absolute cleanliness is an essential element of success. It is not sufficient that the photographer's hands, for instance, be mechanically clean, they must be chemically so; therefore, when he is about to select his papers, he should not be satisfied with the usual washing with soap and water, but should rinse them afterwards in a good quantity of clean water, lest the soap do that mischief it was intended to prevent. This applies still more strongly to the trays used in the various stages of the process. The tray used for iodising the paper should be used for that purpose alone; or if, from the paucity of apparatus—which, in this country, is not always procurable—he is compelled to use it for the exciting solution also, that is the greatest liberty he may take. The exciting dish must never be used for developing, and the dishes for developing solutions should not be used for any other purpose, except washing the paper after it is excited, in which case, if clean, they are not likely to do any harm. After being used with gallo-nitrate, they should be washed as soon as possible in abundance of clean water; and if the gallo-nitrate solution decomposes rapidly when placed in them, they must be washed with a weak solution of cyanide of potassium (5 grains to 1 ounce of water), and with plenty of clean water afterwards. The trays for hyposulphite cannot be used for any other purpose, except for washing the finished negative. The photographer will also find it advantageous to have separate measures and funnels for his aceto-nitrate and gallic acid solution.

PAPER.

The paper used in this process is Canson's thin negative. It is not without imperfections, such as unevenness of texture and minute holes, which allow the exciting and developing solutions to pass through and stain the back of the negative. To the beginner these things are not of much importance, as he must expect to spoil a few papers; but when a little more advanced, he should examine his papers carefully by a strong light, rejecting any that have the imperfections above noted, which need not, however, be thrown away, as the best will do for waxing, which fills up any very small holes, and the remainder will do for positives. The papers should be cut of the same width, and half an inch or so longer than the camera slide. One side of the paper is smoother than the other, which is best ascertained by holding it so that the light falls upon it obliquely; this should be marked, in two opposite corners, with a capital letter, which better defines the side on which the mark is made than a circle or cross.

IODISING.

The solvent may be either whey or distilled water. I believe the former produces the most dense skies, and a greater opacity generally in the dark parts of the picture; it is, however, somewhat troublesome to prepare. The following method of obtaining it is, perhaps, as good as any:—

Let pure milk from the cow stand until it is sour; for each quart of milk beat up the whites of three eggs; add these to the milk, in any convenient vessel; porcelain is best—if brass or copper utensils be used, they should be well tinned. Boil gently over a slow fire for a few minutes, and the caseine will be taken up by the coagulated albumen. When cold, filter through a double fold of cambric, and then through bibulous paper; the latter is a tedious process unless the operator has a large funnel, which he can fill and leave whilst he is attending to other matters. If properly made, it should be clear and transparent, and of a straw coloured tint.

To each ounce of whey or distilled water add the following ingredients:—

Iodide of potassium	7·5	grains.
Bromide of potassium	2·5	„
Cyanide of potassium	·4	„
Chloride of sodium, dry (table salt) ...	·5	„
Sugar of milk	12·	„
Crystallised honey (from the bottom of a jar)	5·	„

Dissolve, and add to the mixture as much re-sublimed iodine as will produce a brown sherry colour; try 10 or 12 grains to the quart of 40 ounces, and if that is found insufficient, add more, as the exact quantity is of no importance. The iodine being rapidly extracted from the solution by the starch in the paper, will require to be renewed occasionally, the necessity being indicated by the paleness of the solution. It is some hours before the whole of the iodine is dissolved.

Filter the above solution into a dish to the depth of one inch, or more if the dish is deep enough. Take a paper by two adjacent corners and place the other end upon the solution so as just to touch it; without pause lower the hands gradually and carefully to exclude air bubbles, for the better seeing of which the iodising tray should be placed between the operator and a window. Let the paper lie for a moment until it is wetted, then take it up by the corners nearest to you, and place the other side of the paper upon the solution in the same way. Then by the help of a bent glass rod, or by tilting the tray, cause the solution to flow over the paper. Should air bubbles be present, they will be indicated by that portion of the paper remaining uncoloured. Put in as many papers as the tray will hold without crowding. When all are in, remove in succession the bottom paper to the top, turning it as you do so; this will enable you to see if the whole have been properly immersed. The dish should be shaken occasionally to prevent the papers adhering to each other, which they have a tendency to do, and which is shown by light patches where the free access of the solution has been prevented. The papers may be immersed from two to three hours, and then hung up to dry.

(To be continued.)

PHOTOGRAPHY IN NATURAL COLOURS.

BY M. E. BECQUEREL.

Many communications having recently appeared in our columns relative to this subject, we are induced to lay before our readers the following interesting paper *in extenso*; as, although it was published some time back in the continental journals, we believe it has never yet appeared in an English periodical:—

I have frequently been asked to communicate my researches on the reproduction of colours by means of the chemical action of light, and I proceed to do so with pleasure, although these experiments extend back several years, and are as yet scarcely applicable to the practice of photography; but as the matter possessing the remarkable property of receiving coloured impressions by means of light is also susceptible of very curious physical modifications, I shall offer some details of the process, in order that persons interested in the study of the chemical action of light may easily reproduce the different effects that I have succeeded in obtaining. There are a number of substances sensitive to the chemical action of light. Some exhibit either a partial or total decomposition, as certain compounds of silver, lead, mercury, gold, platinum, &c. Others require the presence of substances which react upon them, as chlorine in conjunction with hydrogen; chromic acid, with organic matters; guaiacum in conjunction with oxygen, &c. But in general, when the decomposition is either partial or total, or if a chemical action is exhibited, the colour of the impressionable substance changes, exhibiting mostly but a monochrome shade, depending on the nature of the newly-formed compound.

If we take, for example, the iodide of silver, which loses its yellow colour when exposed to the action of light, the new tint exhibited is independent of the refrangibility of the active rays. In order the better to study the effect produced, a solar spectrum must be used—that is to say, the image formed by the dispersion of the solar rays by means of a prism; and if this image is received on a surface covered with iodide of silver, the latter begins to colour itself on the violet portion of the spectrum, and even beyond the violet, and afterwards in the blue; that is to say, in the most refrangible portion of the visible spectrum. But the ultimate colour of this matter, produced by the action of the light, has no relation whatever to the colour of the active portion of the spectrum. In using other substances, it is found that the chemical action is manifested in different portions of the spectrum, and we are therefore led to an analogous conclusion. The preceding observations may be summed up as follows:—That every substance is affected by rays comprised between different limits of refrangibility, and that the reaction once effected, there is generally but a single tint produced, not corresponding with the tint of the active rays. However, amongst the different substances experimented upon, there is one which appears to exhibit several shades of colour under the action of the spectrum, namely, chloride of silver. When prepared under ordinary conditions it assumes a violet tint, under the action of diffused light, and then becomes of a brown colour; if exposed to the action of the luminous spectrum, it begins to colour itself in the ultra-violet and violet portion; and if the action is maintained for some time, and there is sufficient diffused light in the dark chamber, it assumes, in the red portion of the spectrum, a red brickdust tint, as first observed by Scheele, Herschel,* and Hunt,† who have studied the action of light on different sensitised papers, and have each observed that chloride of silver exhibits this red tint in the red portion of the spectrum.

It is known, on the other hand, that chloride of silver, which has become coloured violet, assumes, if warmed, a red tint, exactly similar to that observed in the red portion of the spectrum. It may be asked if this latter effect is not the result of the heat. At all events, since chloride of silver, when it begins to colour, becomes slightly violet, and begins to colour in the most refrangible portion of the spectrum, and, on the other hand, since it assumes a brick red colour in the least refrangible portion, it would be a rather curious coincidence to see the two extremities of the photogenic impressions of the spectrum assume the one violet in the violet, the other red in the prismatic red. I commenced the study of this subject in 1838 and 1839, and at first imagined that the effect of colouring produced in the visible portion of the spectrum was due to the calorific action, but have since discovered that it was not so. At first I endeavoured to find under what conditions these effects might be most certainly obtained. If the chloride of silver be not obtained by double precipitation on the surface of the paper, but precipitated from solutions in a glass and then deposited upon a surface, such as glass, porcelain, &c., and if this chloride has not been previously exposed to the light; as soon as the solar spectrum is exposed to its surface it only becomes affected in the ultra-violet portion, and assumes only a slightly violet tint, which gradually deepens. On the other hand, nothing is produced in the visible portion of the prismatic image. But if a perfectly pure chloride be used without any excess of nitrate, and this chloride be previously sensitised, the effect is very visible. In the violet the tint deepens by degrees, and is similar to what would be produced in the diffused light; in the red portion, however, a slight rose tint is obtained, but no very visible effect is produced in the yellow or green portion, in which, however, may be observed a faint discoloration. If the chloride be obtained on the surface of paper plunged successively in salt water and then in a bath of nitrate of silver—and there should be an excess of nitrate—the effect is not the same. In this case, either the sheet of paper has *not* been previously exposed to the light, and has no chemical action visible except in the ultra-violet portion, or the paper *has* been exposed to the rays and become sensitive in the visible portion of the spectrum, from the blue to the red. There is, then, an *action of continuation*, and the effects of colouring are weak if at all observable.

(*To be continued.*)

INSTABILITY OF CARBON POSITIVES.

It is well known that the Duke de Luynes has founded a prize of 8,000 francs to be given to the person who shall discover a method of printing permanent photographs. Positives printed with chloride of silver fade in time; that is, unfortunately, a fact which cannot be contested (?); there are those which resist more than others, arising from the manner in which they have been fixed, washed, and so forth. In any case, we repeat, it is a pure question of time. From the moment it was admitted that chloride of silver prints had not the character of permanency required by the terms of the Duke de Luynes' prize, all efforts were directed in another way; it was sought to produce prints by means of carbon, or, vulgarly speaking, charcoal. Messrs. Pouncey, Garnier and Salmon, and Brebisson, succeeded in producing by this process some remarkable proofs, and, as all the world said, permanent. Well, it is now proved to us, as clearly as daylight, that these proofs are not more permanent than those with the chloride of silver. How, it will be said, is carbon capable of change? Can carbon, which is the basis of printing ink, be compared with chloride of silver simply blackened by light? Has it not shown what it is capable of doing from the most ancient times? It is not the carbon which we consider capable of change. If this substance were in direct contact with the paper, as in the case of an engraving, there is no doubt a guarantee might be given with each print that it was permanent. Unfortunately, it is not thus. The carbon is separated from the paper by a film of gelatine or albumen of a greater or less thickness; hence it is evident that, if you destroy this intermediary, the carbon, no longer adhering to the paper, must necessarily disappear.

It is in vain that persons may contest this fact; there is a very simple method of verifying it, which is as follows:—Immerse the proof in a bath composed of water and chloride of lime; the action of this bath will dissolve the albumen which holds the carbon, which, deprived of its support, will disappear in the liquid, and the sheet of paper will be restored to its original whiteness.—*Revue Photographique.*

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* Bibliotheque Universelle de Geneve, 1839, tome xxiii., page 185.
† Id. tome xxvi., page 107.

[Even supposing that this result would arise from placing a carbon print in a solution of chloride of lime, we do not see that this militates against the value of carbon as a permanent printing agent, inasmuch as there is no necessity for our putting our prints in such a solution. It would be more to the purpose to show that the atmosphere, or gases therein (ozone, &c.), were capable of destroying the glutinous substance which holds the carbon against the paper. There might then be good reason to say that carbon prints were not permanent.—Ed.]

THE BRITISH ASSOCIATION AT ABERDEEN.

In our number for July 22nd (p. 238) we drew attention to the photographic exhibition which was intended to be opened during the meeting of this learned body. In that notice we mentioned the 1st of September as the last day for receiving photographs; we are now enabled to announce that the time for receiving such contributions is extended to the 6th inst. Pictures will be received unglazed if required, although framed ones will be preferred.

We understand from the excellent honorary secretary, Mr. White, that the exhibition will be likely to prove a most successful one; and when it is remembered that the presence of H.R.H. the Prince Consort, as President of the Association, cannot fail to attract a goodly gathering of visitors, we feel that nothing more than a simple statement of this fact is necessary to induce photographers to send largely of their best.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 29th August, 1859.

MM. Labourdette and Champion presented, a few days ago, to the *Société Philomatique* of Paris a note upon the *Iconography of Fungi* (*iconographie des champignons*). As this note is very short and intimately connected with photography, I will give it here in the words of the authors:—

"In systematic works the science of mycology is based upon such subtle characters, that the application of these characters to enable us to classify species becomes almost impossible. Any natural subject can be known by its physiognomy; it is the physiognomy which dictates in the first place, and the mycological characters, in spite of their well-recognised importance, are, after all, only indispensable elements of critique. The study of the *sporula* of fungi furnishes us, certainly, with a precise botanical character of any mushroom, but does not give us any notion of its size, form, or aspect: it is, however, absolutely indispensable to know this aspect, without which we could acquire no idea of the species or genera. We insist more especially upon this point, as we think that at the present day the application of microscopic elements to classification is abused. If we have only to consider these elements in the classification of fungi, we should commit a great error, and we might just as well endeavour to classify mammalia by characters obtained from the globules of the blood or the zoosperma.

"An illustrious zoologist, M. Schlegel, entitled a well-known book, '*Essay on the Physiognomy of Serpents.*' We think the time has come for writing an '*Essay on the Physiognomy of Fungi.*' As Persoon and Leveillé appear to have foreseen, it is necessary to group them by means of characters that can be appreciated by the naked eye, or according to their natural attitudes, and the circumstances in which they develop themselves. . . . One of us (M. Labourdette) has for some time past had the intention of publishing such a work. But the pencil is not able to delineate the minute details which are observed on the surface of fungi; the physiogonomy of the vegetable is quite lost in these drawings. But that which the pencil cannot do photography achieves with ease, and M. Champion has undertaken the photographic part of the work we propose.

"To-day we have the honour of presenting to the society a few proofs of fungi, natural size, which will speak for themselves and demonstrate forcibly the great importance of this new application of the art. We will only add that this application of photography has required a few modifications in the mode of operating which M. Champion will make known later."

As I have frequently had occasion to remark, the greatest field, or, at least, the most interesting and the most glorious field for photography, is its application to natural history. Most of the *fungi* cannot be preserved in an ordinary herbarium. The only way in which they can be kept at all is in spirits of wine, or some other liquid of the sort, which, however, soon spoils their appearance by dissolving some of their elements. I judge from the present collection in the *Jardin des Plantes*, where it has been found necessary to make wax models of these interesting vegetables, that the inquiring portion of the public which visits every Sunday and fête-day this noble institution, may have some idea of them.

I also know from experience that of all plants the most difficult to classify by the student are fungi and grasses. If photography comes to our aid in this, the difficulty will disappear almost entirely. How great an advantage would it not be, indeed, to the botanical or medical student, if he could buy for a few shillings photographic proofs of the principal *fungi* of his country!

M. Bertsch has applied photography with considerable success to the representation of microscopic objects. To-day the *Illustration Française* gives an admirable and flattering article upon this subject, with four engravings from M. Bertsch's microscopical photographs.

But, up to the present day, these admirable proofs are of no use. M. Bertsch certainly does not perceive the road he must take if he wishes for a lasting success and well-deserved praise. He must not continue to photograph here one object, there another; one day an infusoria, the next a fly's eye, or a flea's leg, &c. He must take for subjects a class of microscopic plants or animals, and photograph the whole, or, at least, the most important subjects of this class, if he desires to be really useful to naturalists. As to the proofs he has produced up to the present moment, they are, certainly, admirable examples of photography, and show what he can do; but they are, scientifically speaking, of little more use than a child's toy.

It will, perhaps, amuse some of your readers to know how photographic journals are composed abroad. We take the best of them. Here are the contents of the *Bulletin* of the *Société Française* for the last month:—

1. "On dryness, darkness, and cold, as preservatives against the alteration of proofs, by Dr. George Wilson." (From a London contemporary.)
2. "Researches on different luminous effects, &c., by M. Edmond Becquerel." (Communicated.)
3. "On thermography, by M. Gaultier and Claubry." (Idem.)
4. "Method of toning by alkaline salts of gold, by Mr. Smith." (From a London contemporary.)
5. "On the Fothergill process, by Mr. Alfred Keene." (From a Liverpool contemporary.)
6. "Impression without salts of silver, by M. Heincken." (From a London contemporary.)
7. "Remarks made in Australia on photographic processes." (From a London contemporary.)
8. "Note on direct positives, by Mr. Traill Taylor." (From a London contemporary.)
9. "On varnish for collodion proofs, by Mr. J. Sang." (From a London contemporary.)

10. "Alteration of glass by exposition to light, by Mr. Gulliver." (From the *Photographic News.*)

11. "On the application of photography to magnetic and meteorological observations, by Mr. Glaisher." (From a London contemporary.)

12. "Decomposition of nitrate of silver by freshly-calcined charcoal." "The solution of nitrate of silver, whether neutral or acid, and chloride of silver dissolved in ammonia, are easily decomposed by charcoal that has been recently calcined. Metallic silver is soon precipitated, and sometimes crystallises." (*No author's name.*)

13. "Method for preserving valuable proofs, by Mr. Browning." (From the *Photographic News.*)

Of these thirteen articles, ten, and probably eleven, are extracted from English papers; two alone are original.

M. Henri St. Claire Deville informs us that in the south of France, between Arles and Toulon, there exist some extensive deposits of iron ore, which have long since been abandoned, on account of the considerable quantity of alumina that it contains. Berthier, who formerly made an analysis of this ore, found—

Alumina	52·0
Peroxide of iron	27·6
Water	20·4
Traces of chrome	
	100·0

The mineral in question was therefore classed among the *giobertites* by M. Dufrénoy. M. Deville, who has analysed another specimen taken out of the rock itself, found—

Crystallised carbonate of lime	12·7
Peroxide of iron	34·9
Alumina	30·3
Water	22·1
	100·0

Moreover, he discovered in it traces of silica, phosphoric acid, titanic acid (?), and notable quantities of the rare metal *vanadium.*

After having calcined the mineral with caustic soda and treated it by water, to wash out, as he thought, the alumina, M. Deville remarked that the alkaline liquid thus obtained deposited regular octahedral crystals (having angles of 109° 15′ or 109° 20′), which were colourless, and which he took for a compound corresponding to the octahedral aluminate of potassa discovered, some time back, by M. Fremy. But on analysing these crystals, he remarked that they became red by hydrochloric acid and disengaged chlorine, which immediately made M. Deville suspect their real nature. They turn out to be a vanadiate of soda, containing 47·8 per cent., or 12 equivalents of water. They are more readily obtained by covering the liquid which deposits them with a layer of alcohol.

The author thinks that vanadium may become, one day or other, largely employed in the arts, especially in porcelain manufactories, on account of the fine green colour it is susceptible of giving to certain enamels. He thinks it is far commoner than is generally imagined, and, at any rate, his own experiments show that large quantities of this hitherto rare metal exist in the ancient clay deposits of the south of France. M. Deville terminates his paper by reminding us, that although vanadium has, up to the present time, been looked upon as a great rarity, the estimable works of Sefstroem, Berzelius, MM. Wöhler and Rose have given us a very complete history of the properties of this metal.

Vanadium was on the *tapis* again last Monday at the Academy of Sciences here. M. Chevreul communicated a short paper by M. Bonvallet, who assures us he has been able to extract considerable quantities of vanadium, or rather vanadic acid, from the clays of Chantilly, but that he has not once met with this substance in the tertiary clays of the environs of Paris. The foreseen applications of this, comparatively speaking, new metal, tend towards the art of dyeing, but who knows but what important benefits may be gained by photography in the application of such a substance!

A certain parasite worm which inhabits the muscular tissue in the human species is at present, according to M. Virchon, very common at Berlin. This worm is the *Trychina spiralis*; it has hitherto been considered a zoological rarity.

M. Isidore Pièrre, who is well known on the Continent by his indefatigable researches in agriculture, has just made known the existence of butyric acid in various manures, and in the soil. This acid was discovered by Chevreul in butter; he recently found it again in the greasy matter contained in sheep's wool. M. Isidore Pièrre is the first person who signalises this product in the soil.

I regret to say the Paris papers announce the death of M. Boitard, one of our ablest naturalists; he died at an advanced age, and his loss will be much felt in the scientific world. Botany and entomology were the sciences in which he acquired most of his well-deserved reputation, and his name will be long familiar to students of natural history.

Photographic Notes and Queries.

CONVERTING POSITIVES INTO NEGATIVES.

Sir,—I should not venture to write upon this subject, as you have so many able correspondents upon all the various modes of operation in photography, had I not observed in your journal of late one or two articles which appear to be quite erroneous, both as to the means employed and the original inventor. My late friend, Mr. Archer, says: "Prepare a saturated solution of bichloride of mercury in muriatic acid, add one part of this solution to six of water; pour over the picture evenly, it will deepen the tones immediately, the picture almost disappearing, but in a few minutes a beautiful white picture will be brought out." This is the only and the first intimation we have of the process now called the alabastrine, and claimed now by so many; it, however, exclusively belongs to the late Mr. Archer, who communicated it to me so long since as 1850, and then published it in his book of the same year. There are many modifications of the above, but, without doubt, this is the best and the original mode. Many trials have been made to convert the positive picture into a negative, all of which have turned out more or less a failure. I now give a mode which has not been published, to my knowledge, by any one, based upon the above, and the credit, if any, of which I take, therefore, to myself, having for six years experimented therein—and assure all those who choose to attend to my directions that they may obtain a clear, sharp, and dense negative, at all times, from a good positive, having all the half tones and intermediate shades which render a picture more or less beautiful, as they appear or not; it possesses, also, this advantage, that you may show a party the picture at once as a positive and be certain that the paper proofs will be exactly like the one shown, which is not the case with the usual mode of taking negatives, and which can only be looked at by an experienced eye, and often, even then, is not at all the thing expected. After whitening the picture, as above described, next wash it in clean hot water, then take thirty drops of the liquor ammonia, P.L., and add about an ounce of distilled water; mix them intimately and pour evenly over the positive; continue to pour it off and on, when the picture will assume a dark tone and continue to darken until it arrives at a dense black, but still retains a semi-transparent appearance and never losing its half tones. Should the ammonia used once be used again, the picture will assume a purple tone, which will print better than the first. I must add, that in order to succeed in this process, the glass must be cleaned with even more care than usual, or the film will, to a certainty, be washed off the glass. After the tone required is obtained well wash in hot water again, dry spontaneously, and varnish.

Fred. Debenham, C.E.

PLATE-CLEANING LIQUID.

Sir,—The following solution for cleaning glass plates will be found efficient and economical:—Dissolve two ounces of common washing soda in half a pint of warm water, and when the soda is dissolved—but not till then—add four ounces of common salt, or more, to make a saturated solution. Stir till dissolved, and bottle for use; adding an ounce of the finest Tripoli powder. After cleaning the plates with this liquid, be careful to wipe the edges with a wet cloth, and then with a dry one, to remove any portion of the solution that may adhere, and which will decompose the silver bath.

There is another mode of using the liquid, which saves a great deal of trouble when many plates are to be cleaned. Make a sufficient quantity, of half the above strength, and without the addition of Tripoli. Steep the plates in this for several hours, or all night, and take out one plate at a time, drain it, rinse it in a pan of clean water, rubbing both surfaces well with a wet cloth, rinse it again and stand on end. When a dozen plates have been thus treated, wipe them dry with one diaper cloth, and polish with another, when they will be found beautifully clean, with a surface of great brilliancy. The common glass requires more cleaning than the patent plate, and a longer soaking in the salt and soda solution, which can be used again and again to the last drop. X. X.

ECONOMISING THE NITRATE BATH.

Sir,—I have lately seen several letters in the different journals respecting the great waste of silver by photographers, one of which recommended the use of blotting paper for draining plates when removed from the nitrate bath. There is, however, a much simpler plan than this, and though a great many of your readers are no doubt acquainted with it, there are, I think, a good many who are not.

The plan is this:—Take the plate by one corner, and rest the opposite corner in a clean, dry, glass measure; then lean the corner you hold in your hand against the wall, and let it stand for a minute or so. The quantity of silver solution saved by this means, even from small plates, is quite surprising. H. M.

NEW DRY PROCESS.

Sir,—Permit me to make the following corrections in the article on a new dry process in your number for the 26th ultimo:—In section 3, line 9, for "their potation" read "thin potations." In section 9 place the comma (,) after "6 parts" and "1 part," respectively. J. B. Hockin.

ANSWERS TO MINOR QUERIES.

Mottled Appearance in the Waxed Paper Process.—*Ellab* writes that the first or second time he uses a new bath for sensitising waxed paper for the negative process, he is always troubled with patches of a paler colour than the other parts of the sheet. He is certain that it cannot arise from an insufficient time of floating on the silver bath, as he has tried all times of exposure to its action, and it seems to be worse the longer it is being made sensitive. The cause of this effect is, that the newly-made solution of nitrate of silver is not previously saturated with iodide of silver, and consequently when the sheet of iodised waxed paper is floated for any length of time on the bath, the iodide of silver which is at first formed, is partially redissolved; and this taking place to a greater extent as the sheet is kept longer in contact with the bath, fully explains our correspondent's remarks. The remedy for this will be, to saturate the silver bath with iodide of silver by adding about half a grain of iodide of potassium to each ounce of the bath, and well agitating, and allowing it to rest for a few hours before filtering.

Analysis of Collodion.—It may easily be ascertained whether the iodising solution contains iodide of cadmium, potassium, or ammonium, in the following manner:—Take a portion of the solution and add to it twice its bulk of pure anhydrous ether; if a precipitate is formed, iodide of potassium is the salt used. To another portion add a drop of ammonia; if a precipitate be formed in this case, there is probably cadmium present, whilst an absence of a precipitate in both cases shows that iodide of ammonium has been used.

TO CORRESPONDENTS.

In our next number will be given an important paper by Sir J. F. W. Herschel, Bart., F.R.S., fully illustrated with diagrams, and the commencement of a series of articles by Mr. Alexander Wall, on "Photographic Failures: their Causes and Remedies." Subscribers commencing with the new volume will shortly have presented to them a large-sized specimen of the progress of the Photoglyphic Art, which, by the courtesy of the inventor, Mr. H. Fox Talbot, is in active preparation. Notwithstanding the success which has attended our endeavours to make the thorny paths, which lead to excellence in our fascinating art, more easy of access to students, we shall by no means rest satisfied with our present position; and we therefore beg of our friends to enlarge still more our sphere of usefulness, by recommending the "Photographic News" *to those of their acquaintances who have not yet availed themselves of the information afforded weekly in our columns.*

R. A. W.—Will the gentleman who, in recent numbers of the "Photographic News," so graphically described, under these initials, a photographic trip up the Wye, kindly inform us where a letter may be addressed to find him?

The Stereoscopic Exchange Club.—Communications have been received from J. W. G.—H. H.—J. R.—A. N.—J. S. O.—S. S. B.—R. M.—H. W. L.—F. H. *Specimen Photographs* (without which no name can be inserted) have been received from the first five only of the above: as the complete list will be inserted in our next, attention is requested to this point.

V. C.—Try the following plan:—Add a few grains of metallic cadmium to your bath and boil it violently in a clean Florence flask for half-an-hour; allow it to cool, and filter; then add solution of carbonate of soda, drop by drop, until there is a permanent precipitate, and filter again. Next add acetic acid until there is a faintly acid reaction, and the bath *ought* to be in first-rate working order: if, however, it be not so, you must conclude that something has got into it which has ruined it, and the best plan will be to discard it in favour of a new bath.

J. W. L.—We are glad you approve of the apparatus. 1. Perhaps the lenses may require a little final adjustment; that can seldom be done correctly by the camera maker, but requires the operator to work with them once or twice to find out what is really wanted. 2. Nothing but ocular inspection on the ground glass will answer this question. 3 and 4. Perhaps the collodion had not perfectly settled.

Sunbeam.—We hardly understand your question. Of the two collodions you mention, the one which dries round the neck of the bottle in rough films, which are liable to drop off on to the plate, is of a *contractile* kind, whilst the other, which adheres closely to the neck, leaving an opaque film, is of the powdery variety. The former kind may be converted into the latter by many plans, and becomes spontaneously so on keeping.

W. R. H.—The process you have tried is not one of the best, and only very experienced photographers can hope to succeed at it. We should advise you to attempt the collodio-albumen or Fothergill process in preference: the results will be better, and will be obtained at a far less expenditure of patience and failures. We thank you for your offered diagram of the stand, and shall be very pleased to receive it.

A Constant Subscriber.—If there is any copyright attached to the lithograph, you would be clearly in error to attempt to sell a photographic copy of it: but if it be one to which there is no copyright, you will be entitled to sell as many copies as you please, provided you employed a lithograph of your own to take the copy from, and not the one sent to you by your customer, unless you had her express permission.

Bonaccord Amateur.—Your black varnish is too brittle; add something to it which will tend to give it toughness when it is dry, such as solution of India-rubber, or a few drops of drying oil. Some useful information on this point may be found on consulting the Index of our first volume.

Stupid Subscriber.—We think your bath is more to blamo than yourself. Some organic matter has most likely found access to it, which has caused it to act as you describe. Treat it in the manner recommended to "V. C." above.

C. E.—Add a little acetic acid to the milk and boil it; filter from the curd. The clear solution will answer the purpose. Marion's paper is the one usually employed. When acetic acid is recommended, the best glacial should be used, unless some other sort is stated.

Goodwill.—The formula for the toning bath is not good. Try the one given in one of the first numbers of the present volume (by Θ), and you will have no difficulty in obtaining good dark brown or black tones.

W. G. P.—We are much obliged for the trouble you have taken to forward a copy of the paper. It had, however, previously appeared in the pages of a contemporary.

Muddle.—Theoretically, the divisions at the end of the beam would have more value than those towards the centre, but in practice the difference is found to be so slight that it is never regarded even in the best balances.

W. H. B.—The stereogram is very good; if anything, the tone is a little too red, but some persons prefer a rather warm colour. We shall be pleased to receive the particulars of the process.

Grateful.—Do away with the top and side curtains, except in very bright weather. From your letter, we fancy you have not light enough.

D.—A good lens, bright light, and chemicals, in first-rate condition, are all that are wanted to take instantaneous pictures.

H. D.—We regret to hear of your accident; we will communicate your kind offer of advice to our correspondent.

T. Raymond.—We will inquire.

Communication declined with thanks.—Nostrum.

The information required by the following correspondents is either such as we are unable to give, or it has appeared in recent numbors of the "Photographic News:"—O. A. R.—P. L. E.—Rev. O. O.—Stereo.

In Type:—J. D.—S. B.—H, J. J.—S. Artridge.—J. S. Overton.—G. R.—Knostlan.—W. L.—G. H. W.—I, W. W.—Inquirer.—C. H. Paine.—W. W. Burnard.—G. A. M.—H. and J. Walter.—Iota.—H. S. I.—One in a Fix.

Cases for Binding Volume II. have been prepared, price 1s. 6d. each. Subscribers may have their copies bound by the Publishers, in the usual manner, price 2s., including the cloth case.

⁂ All editorial communications should be addressed to Mr. Crookes, care of Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard. Private letters for the Editor, if addressed to the office, should be marked "private."

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